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Impact of Gated Communities on Local Mobility

by

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A THESIS

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DECLARATION

I hereby declare that the thesis entitled “**Impact of Gated Communities on Local Mobility**” submitted to the Department of Architecture in partial fulfilment of the requirement for the degree of Master of Science in Urban Planning, is a record of an original work done under the guidance of Dr. Ajay Chandra Lal, Institute of Engineering, Pulchowk Campus. This thesis contains only work completed by me except for the consulted material which has been duly referenced and acknowledged.

Ashraya Pradhan

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ABSTRACT

Gated communities are residential areas with restricted access designed to privatize normally public spaces. These secluded clusters of houses form a separate community within its walls. They often have facilities and infrastructures that are not open to the public. Mobility is the ability to move or travel around easily. Kathmandu has seen a surge in the development of gated communities. These communities restrict access and contribute to densification while reducing access.

Gated communities especially housing colonies are gaining a lot of popularity in Kathmandu valley. Most these developments are constructed in the suburban or peri-urban areas where the growth and development is relatively low. The introduction of these projects accelerates the rate of population growth and infrastructure development. With the first gated community, Kathmandu Residency, an apartment complex development starting in 2000 A.D. followed by the first housing colony, Civil Homes, in 2001 A.D. Construction and sale of housing colonies have skyrocketed. This boom in real estate development business comes along as proper regulations and guidelines are lacking to adequately regulate such developments. The inadequacy in regulation, lack of proper and specific guidelines causes various issues and impacts in the society and lives of the general public excluded from these secluded abodes.

This research aims to identify the legal provisions and restrictions of these gates. It shall look into if and how accessibility is or can be affected. A literature review of gated communities and a review of legal documents related to housing, public roads and lands confirm that the law for approval and allowance of construction of housing colonies and particularly gates in such colonies are lacking.

Direct observation and unstructured in-depth interviews reveal that accessibility is a growing issue with the increase in urbanization, population growth and densification. Opening the gates of such communities or them requiring to provide access should be an option to increase accessibility and mobility of the growing area.

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LIST OF ABBREVIATIONS

CBD	- Central Business District
CBS	- Central Bureau of Statistics
CIUD	- Centre for Integrated Urban Development
DoTM	- Department of Transport Management
GIS	- Geographic Information System
GLD	- Guided Land Development
HOA	- Home Owners' Association
JICA	- Japan International Cooperation Agency
KMC	- Kathmandu Metropolitan City
KVTDC	- Kathmandu Valley Town Development Committee
LUP	- Land Use Policy
MoUD	- Ministry of Urban Development
NEA	- Nepal Electricity Authority
NLHDA	- Nepal Land and Housing Developers' Association
NTC	- Nepal Telecommunication Corporation
NUDS	- National Urban Development Strategy
TDC	- Town Development Committee
TDPIC	- Town Development Plan Implementation Committee

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1. INTRODUCTION

1.1. Background

“A gated community is a housing development on private roads closed to general traffic by a gate across the primary access. The developments may be surrounded by fences, walls, or other natural barriers that further limit public access.” (Grant & Mittelsteadt, 2004)

Kathmandu has seen the emergence and development of many gated communities in the past decade. These include housing colonies, apartment buildings and private group housing. These secluded communities cause various impacts in the surrounding locality. They may be economic, social or environmental albeit not all are negatives.

“Gated communities are residential areas with restricted access designed to privatize normally public spaces. These new residential areas occur in both new suburban developments and older inner city areas for the purposes of security and segregation. The developers of gated communities brilliantly market their projects as safer, friendlier, and more economically stable traditional urban or even suburban neighbourhoods.” (AJIBOLA, et al., 2011)



Figure 1 Gated Communities

People, residents go to these communities in search of security and a higher standard of living. These communities play a role in the land usage, land value, urban management of the area. There are meanwhile some restrictions in the development of these “privatized public spaces” (AJIBOLA, et al., 2011). However “it is the absence of these groups from most aspects of city living that creates a wider problem for those concerned with the quality of civic spaces and institutions.” (Atkinson & Flint, 2004)

Oxford Learner’s Dictionary defines mobility as “the ability to move or travel around easily” It says mobility is “the ability to move easily from one place, social class or job to another”. It iterates how easily and conveniently a person can travel to and from places. It gives an idea of how easily can a person access services and facilities. Gated communities come up and densifies settlements. However, it closes its gates to the general public who happen to live outside the gates. This can cause various issues on mobility and ease of access. A possible alternate path or access way is blocked by the community. Where with densification ease of access should increase, gated communities form barriers to the accessibility of various infrastructure and services.

This research is an attempt to look at the impact of gated communities in the local mobility and ease of access. To study if these “fortified enclaves” (Atkinson & Flint, 2004) create more problems than solutions in the locality.

1.2. Problem Statement

With rapid urbanization and urban densification in Kathmandu in recent years, people have started seeking housing and residence in the peri-urban areas of Kathmandu. People migrating in from outside cannot afford to buy land in the main city so they move to the outskirts and suburbs, or people traditionally from the core cities move out due to congestions. This trend of gentrification has fuelled the boom in the development of gated communities. People seeking affordable housing prefer to avoid such communities, while people seeking comfort, luxury and security gravitate towards gated communities. This however comes at a premium price. “Gated communities reflect an urban entity that is physically and often socially and economically differentiated from the surrounding urban environment.” (Landman, 2000). With this

kind of seclusion and isolation, there tends to be a disconnect in status, class, amenities, services, facilities and lifestyle among the locals.

These secluded clusters of houses form a separate community within its walls. They often have facilities and infrastructures like parks, department stores, swimming pools, community halls among others. The public or anyone not part of the gated community is not allowed in and not allowed to use any of the amenities. Likewise, communities that have connections to two or more roads at its boundaries benefit from alternate route options. However, residents excluded from this walled housing cannot use said road and ease of access is compromised and mobility is affected.

1.3. Need of Research

The trend of gated communities is growing rapidly in Kathmandu. Developers and residents alike are highly interested in the concept of gated communities, secluded living and privatized spaces. Comfort, security, status, elite residence etc. are the terms that are generally associated with these enclaves. Locals view families living in these cordoned off bungalows and villas as elites or ones with a higher social status. This creates a sort of social divide and social disconnect. As this concept of secure, secluded living sees rapid interest and development in the urban context of Kathmandu, little study has been done in the impacts that these communities has in the locality. The trends of land use and land use changes, the pace of development, the demand of infrastructure, the outcome of such growth along with all the factors these gated communities affect largely remains unchecked. The changes and challenges thus brought by the introduction of or development of such privatized spaces needs to be studied to help regulate and ease livelihood while improving access to infrastructure and facilities.

Strategies, policies, plans, including land use policies, development strategies, housing byelaws, infrastructure development plans need to take into consideration the impacts these communities have on the surrounding areas to formulate rules, regulations and policies. The thought out strategies thus implemented will help regulate these developments and ensure all parties have equal, easy access to infrastructure and reduce social divide and benefits.

1.4. Importance of Research

“Gates and guards” (Webster, et al., 2002) has been gaining popularity in Kathmandu in the past decade. The business of building, selling and buying of gated communities has seen a significant growth in Kathmandu. The periphery and the suburb areas of the valley are seen littered with these gated and guarded communities. However, “gates and guards are just one part of a bigger package” (Webster, et al., 2002). These urban developments impact the accessibility, the mobility, the land use along with the development pattern and pace of the locality.

This research aims to highlight the issues and benefits surrounding gated communities. To describe gated communities, explore its types, its contribution to society and social structure. To examine the effect, it has on the livelihood and structure of society. How local mobility and ease of access are affected by the introduction of closed housing communities and apartments.

Thus, this study will be useful to planners, policy makers, and developers to plan for a better urban area, formulate policies for sustainable and appropriate urban growth and develop said land appropriately.

1.5. Research Question

- What are the impacts of gated communities on surrounding communities in the aspect of mobility and accessibility?

1.6. Research Objectives

- To measure impact of gated communities on local mobility using specific parameters
- To examine the bottlenecks created due to restricted access from the gated community
- To review the legality of gated communities and provide possible policies to address issues

1.7. Validity of Research

It is important in planning to foresee possible issues and provide measures to curb these issues. With gated communities gaining much popularity, the issues these communities might pose are relatively unexplored. These closed and secluded residential developments causes relative rapid increase in density while restricting access and mobility. This research attempts to highlight issues created by gated communities and the gaps in policy and planning procedures.

This study will look into traffic flow in the area with a lot of gated communities, study the policies relating to these communities and explain how mobility and accessibility is affected and look into possible means of correcting or improving them.

1.8. Expected Outputs

Gated communities restrict access through its premises. The legality of this is questionable. With the popularity of gated housing colonies rising, it is imperative to understand the issues and challenges gating might create in the future. This research hopes to provide insight on the issues, legality and possible solutions in regards to the issues in mobility created by gated communities,

Gated communities, its types and functions will be iterated and described. Mobility, accessibility, ease of access and parameters related to the same will be discussed. The legality of gates and gated communities in terms of group housing projects will be studied and presented. How mobility is affected due to restrictions in movement through a gated community is experimented and presented.

Then possible solutions and opportunities for betterment is recommended.

1.9. Scope of Study

The research studies why gating is done in a community. It explores the legality and validity of the gating. It shall explain the types of gating and gated community; the reason people commonly seek to live in gated communities. It will measure the extent of the effect on mobility due to the access restriction of gated community in Bhaishipati.

It shall study various laws, policies and strategies that relate to or should relate to the phenomenon of gating, the legality of blocking passage, the process of permit to plan, design and construct such communities. It shall then review and recognise issues and shortcomings in these legal documents then recommend possible changes, opportunities and requirements to improve and ensure the rights and duties of all parties involved.

The research however does not explore the socio economic differences, the rift in class created and other administrative and law enforcement impacts gating and gated communities may have.

2. CONCEPTUAL FRAMEWORK OF RESEARCH AND METHODOLOGY

2.1. Research Paradigm

The Oxford Dictionary defines **paradigm** as “a typical example or pattern of something”. It is something that describes a typical pattern, behaviour or an example of anything. When defining “research paradigm”, it can be described as an established model of thought and ideologies that a large number of people in the research community accept and follow. Kuhn describes paradigms as “sufficiently unprecedented to attract an enduring group of adherents away from competing modes of scientific activity” and being “sufficiently open-ended to leave all sorts of problems for the redefined group of practitioners to resolve.” (Kuhn, 1962) c.f. (Orman, 2016). It is further described as “A paradigm is a basic belief system and theoretical framework with assumptions about 1) ontology, 2) epistemology, 3) methodology and 4) methods. In other words, it is our way of understanding the reality of the world and studying it.” (Rehman & Alharthi, 2016).

This particular research requires specific data for the fulfilment of objectives stated above. This shall require a definite way of looking at the research problem. Thus, suitable research paradigm and methodology needs to be associated with the thesis.

Positivist paradigm believes in empiricism, the idea that observation and measurement was the core of the scientific endeavour. The key approach of the scientific method is experimentation, the attempt to discern natural laws through direct manipulation and observation. Positivists believe that social observations should be treated as similar to how scientists treat any physical phenomena. Here, researchers believe that the observer is separate from the subject of observation and can perform a well-informed judgement. Positivism is the scientific method where all ideas are based on rationality. Positivists tend to look at social science same as the natural world. They are also called quantitative purists. This thesis primarily aims to study the impacts of the gated communities to the area. One of the research objectives requires to explore the socio cultural issue and

cannot be solved with a universal truth. Quantitative data is not sufficient here. Thus, positivist paradigm is not adequate for this research.

Post positivist paradigm states that the social science cannot be looked as the natural science. The truth may differ from cases to cases. It sees the world as ambiguous and variable with multiple realities - "what might be the truth for one person or cultural group may not be the "truth" for another" (O'Leary, 2004) suggests that post positivism is intuitive and holistic, inductive and exploratory with findings that are qualitative in nature. Post positivist paradigm is based on most likely truth. This study is related to the impacts gated communities have on mobility of its surrounding locality. This requires quantitative as well as qualitative data thus, post positivist paradigm alone cannot fulfil the requirements of this thesis.

Critical theory/ Transformative paradigm has two main propositions. One being that people are shaped by the society in which they live. This so implies that there is no such thing as an objective fact that can be observed by a person without being involved and learning the societies area known outside of social structure. The other proposition is researcher or intellectuals should try to be objective and not let their personal matter or emotions hamper judgement. "The ontological position of critical theorists is that of historical realism. It is assumed that a reality exists, but it has been shaped by cultural, political, ethnic, gender and religious factors which interact with each other to create a social system. Epistemologically, critical theory is subjective in that it is assumed that no object can be researched without being affected by the researcher. Critical educational researchers try to be self-conscious of their own epistemological presuppositions and communicate them clearly when entering into an investigation." (Rehman & Alharthi, 2016)

Gated communities in Kathmandu is a development emerging and booming rapidly in relatively recent times. It is also creating is a real problem and can cause a lot of issues in the local area. One can hope to be unbiased and provide with good judgement and observation every time, however it may not always be possible. Thus, critical theory is not a suitable logic to be followed while performing this research.

Interpretivist/Constructivist paradigm assumes that all knowledge is gained through experience and previous knowledge. It argues that learning is a constant project and an active process. Constructivists are referred to as qualitative purists, as they reject positivism. It says time and context free generalization is not possible. Constructivists believe in qualitative research process. They believe that the locals or people involved in a certain field for a period of time have more knowledge and insight than the outside observer. This research also aims to look at all the issues and hindrances these gated communities are causing rather than just social research. Thus, an interpretivist or constructivist paradigm alone isn't adequate for this thesis.

Pragmatic paradigm is a simple mix of qualitative and quantitative research logics. "Pragmatism is not committed to any one system of philosophy or reality." (Mackenzie & Knipe, 2006). As a research paradigm, pragmatism is based on the proposition that researchers should use the approach be it philosophical and/or methodological that works best for the specific research problem. "The focus is on the consequences of research and on the research questions rather than on the methods." (Kaushik & Walsh, 2019). Pragmatic paradigm is not to be mistaken with two paradigms merged together rather a process of using both paradigms.

Since the objectives of this research includes looking at real issues of mobility and accessibility, it needs to deal with both the expertise of the locals and residents and utilize the external observers point of view. Thus, both post positivist and interpretative paradigm shall be used in this research process.

2.2. Research Methodology

Ontology is among the main elements of a research paradigm. It is the study of reality. It forms the understanding of the researcher and helps formulate the progress of the research. Here, the ontological position in this research is that "Gated communities reduce ease of access while increasing density of a locality"

Gated communities that includes both housing colonies and apartment complexes have been steadily gaining popularity in Kathmandu among both residents and developers. These communities are marketed as upper class, secure and posh by the developers,

likewise residents move into these communities in search of security, calm and secluded living within the city. Most of these communities are developed in the outskirts and suburbs of the city to ensure affordability. Thus, when these developments start in these suburbs, the sparsely populated area suddenly sees rapid development and growth. The gated community adds a lot of houses and families in an area in a short span of time. The surrounding areas grow to provide support to the community in terms of building materials as well as other construction needs while under construction and to provide daily requirements to the growing population. Thus, the introduction of gated community significantly increases the density of a place in a relatively short time.

When the population of the housing colonies and apartment complexes are seen, it can be observed that majority of the households own at least one personal vehicle. This also significantly increases the vehicular traffic density of the area. However, various access ways may be blocked by these communities. Ultimately increasing travel time. It also closes its gates to any amenities or facilities that may be housed within its boundaries. Restricting public movement and access to amenities results in decreased ease of access to the residents of the surrounding community.

Increased travel time, more congestion, less ease of mobility and accessibility along with densification is seen in areas where gated communities have developed. In an open urban context, accessibility should increase with increased density as more roads, amenities, and services are added along with the growth.

“Epistemology is concerned with the nature of knowledge and ways of knowing and learning about social reality” (Bergin, 2017). It is the means or method to be followed to learn or shed light on the ontological claim of a research.

The methodology for any research is defined by the paradigm it is following. Here, this research shall follow a pragmatic paradigm where it will take into account both qualitative and quantitative data to induce conclusions.

Qualitative data may be observed and recorded. This type of data is non-numerical in nature. Qualitative data is usually collected through various methods such as observations, one-to-one interviews, conducting focus groups discussions, and other similar methods to engage public and take their views and opinions. This type of data

in statistics can be known as categorical data that is, data that can be arranged categorically based on its attributes and properties.

Quantitative data can be defined as the value of data in the form of numbers or counts. Here each data-set has a unique numerical value associated with it. This data is any quantifiable information that can be used for mathematical calculations and statistical analysis,

This research shall be conducted based on the inductive approach.

Inductive approach generally means the bottom up approach which starts with observation and ends in theory or conclusion. In this logical framework, the observations are made first. This can lead to patterns and regularities shall be abstracted. Following that hypothesis are proposed and tested. After that a theory or conclusion is drawn in relation to the initial ontological claim. In short, inductive approach is starting with a statement, observing patterns and ending with generalization.



Figure 2 Inductive Approach

However instead of perfect induction, the inductive approach will be based on imperfect induction. This shall be based on limited observations with generalizations, and a wide use of the principle of probability. Nonetheless, efforts will be geared towards making more findings and collecting data so that there is a higher likelihood that the generalization made at the end of the study would be closer to reality.

2.2.1. Literature Review

A literature review is a systematic overview of prior research on a topic. The literature review studies scholarly contributions, books, and other applicable sources for a particular research field. This should summarize, evaluate and clarify any prior research

in the field. It should provide a base for the research and help determine the nature of the research.

Firstly, literature relating to gated communities, its origins, types and characteristic was studied. This helped form the basis of understanding of gated communities. How they are formed, why they are popular and how it affects the society. These articles, books and reports related to gated communities, their types, issues and challenges was referenced through various scholarly domains and portals. Also papers on mobility, accessibility and ease of access was reviewed. These studies then helped to define parameters of mobility and ease of access. This as a result helped streamline and measure the impacts on mobility.

2.2.2. Case Studies

A case study is a research strategy and an empirical inquiry that investigates a phenomenon within its real-life context. They are based on an in-depth investigation of a single individual, group or event to explore the causes of underlying principles. In research, it can be single or multiple case studies, include quantitative evidence, rely on multiple sources of evidence and benefit from the prior development of theoretical propositions.

Case studies on foreign gated communities, their structure, size, characteristics and how they function has been done with the help of peer reviewed literature and reports. These helped understand, acknowledge and appreciate the scale, structure and character of these communities.

2.2.3. Policy Review

Policy is a set of ideas or a plan of what to do in particular situations that has been agreed to officially. It is a document showing an agreement on the plans and actions to be taken or implemented

Policies, laws and regulations related to gated communities, housing, and joint housing was reviewed and interpreted.

The review of legal documents were done to understand the legality of gated communities in Nepal. Documents such as The Lands Act, 2021 B.S., Public Roads Act, 2031 B.S., The Ownership of Joint Housing Act, 2054 B.S., Building Byelaws, 2064 B.S., and The Right to Housing Act, 2075 B.S was studied. These documents provide an understanding the legal provisions around development, purchasing, selling and maintenance of gated communities.

2.2.4. Data Collection

Primary data is data that is collected by a researcher from first-hand sources, using methods like surveys, interviews, observations, focus groups or experiments. It is collected with the research project in mind, directly from primary sources. Secondary data is data gathered from studies, surveys, or experiments that have been run previously. Secondary data is usually defined in opposition to primary data. It refers to data collected by someone other than the user / researcher. In other words, secondary data refers to data that have already been collected for some other purpose. Yet, such data may be very useful for one's research purpose.

This research shall involve primary and secondary data collection for understanding mobility patterns, access ways and infrastructures. Primary data such as traffic count, commute time, distance shall be collected. Also unstructured in-depth interviews with locals shall be done to understand the local mentality and the issues and challenges they may be facing. Secondary data such as time, population, vehicle registry, housing company registry, articles, surveys, GIS maps etc. shall also be referenced.

2.2.5. Field Visit

To understand the mobility patterns, ease of access, volume of traffic, distance to be travelled, researcher shall visit site observe the patterns and identify bottle necks. Traffic volume shall be measured and time of commute shall be defined and measured on site. Distance to travel shall also be determined and assumed in case of hypothetical scenarios. Researcher shall also interact with local residents, business owners and traffic management personnel.

2.2.6. Data Analysis

Data collected shall be studied and examined. Traffic counts, patterns, distances, commute time shall be analysed through researcher observation. The meaning and gist of interviews, patterns and volume shall be interpreted through the researcher perspective. Then assumptions regarding a hypothetical scenario shall be made to come up with possible solutions.

2.2.7. Recommendation

After doing the literature study, reading the policies, going for field visits, talking to the locals, collecting traffic data, looking at similar possible cases, the information is processed, data analysed.

Following the literature study, data collection, compilation and analysis of the study area, recommendations on policies and regulations shall be suggested.

2.3. Limitations

Analysis is done via personal interpretation, there may be some bias to the results and outcomes. Since the data collection for the research will be done via interviews and the opinions of people are susceptible to change over time and change of context, the research will be true to the present scenario of the study area.

3. LITERATURE REVIEW

3.1. Gated Communities

Gated communities are not a 'new' phenomena. Fortified communities have their roots in England around 300 B.C. Roman soldiers erected walls and defences within the villages they occupied to protect themselves from mutinous villagers. (Blakely & Snyder, 1997) Medieval towns also featured walls, towers and gates. However, the increased prevalence of this kind of residential development since the 1970s has drawn the attention from scholars and commentators across the globe.

“A gated community is a housing development on private roads closed to general traffic by a gate across the primary access. The developments may be surrounded by fences, walls, or other natural barriers that further limit public access. Gated developments have an inside and an outside.” (Grant & Mittelsteadt, 2004) These aren't simply barricaded areas to help regulate or ease traffic. These are fenced developments built with security and private spaces in mind. These communities typically have fences or walls surrounding them. The entrance and exit have gates and are usually guarded around the clock. Access is provided only to residents or guests of residents. This mostly describes the physical aspects of gated communities.

For Blakely and Snyder, gated communities are controversial, as these communities consists of 'residential area in which normally public spaces are privatized'. The gated community is a 'manifestation of broader social forces' such as privatization, which is reflected in the use of physical devices to moderate the influences of the outside world. Residents of gated communities are using the walls, entry gates and guards in an effort to keep perceived dangers outside of their homes, neighbourhoods, and social world. (Quintal, 2006)

It has been argued that gated communities are an 'anathema to Government policies aiming to increase social cohesion and reaffirm linkages between neighbourhoods' (Blandy, et al., 2003). It is also stated that “the gated community contributes to a geography of social relations that produces fear and anxiety simply by locating a person's home and place identity in a secured enclave, gated, guarded, and locked'

Despite this criticism, gated communities are a common form of residential development in the United States, South Africa and Latin America and are growing in popularity in places such as Indonesia. (Quintal, 2006). Nepal is also seeing an increasing public interest and popularity in terms of gated communities, their prospects, characteristics and development.

Developers, landowners, investors, and consumers have together shaped a new genre of modern urban habitat. An increasingly sophisticated mass market has emerged in entire neighbourhoods, comprising homes, community infrastructure, services, and micro urban governance. Gates and guards are just one part of a bigger package. The phenomenon is a spontaneous one and it has spread rapidly within and between countries. Its significance lies not so much in the physical impact of gated developments, though this may pose challenges to urban designers, but in their underlying sociology, politics, and economics. In short, they challenge the spatial, organizational, and institutional order that has shaped modern cities. (Webster, et al., 2002)

Gated communities are residential areas with restricted access designed to privatize normally public spaces. These new residential areas occur in both new suburban developments and older inner city areas for the purposes of security and segregation. The developers and builders of gated communities brilliantly market their projects as safer, friendlier, and more economically stable traditional urban or even suburban neighbourhoods.” (AJIBOLA, et al., 2011)

There is also a continuous rise of community associations. These are contractual associations that deliver some form of neighbourhood-level governance in the form of regulations and local civic goods and services on the basis of assessments (fees) collected from members. (Webster, et al., 2002)

Some gated communities reflect the growing range of choices available to consumers in the postmodern city. The affluent can move to gated enclaves in search of privacy and exclusivity, and in flight from fear, closing themselves off from the dangers outside. (Dillion, 1994)

There may be compelling international trends in taste, but these may transform differently, in the context of locally specific social and environmental capital. Important in this respect are local variations in the institutions (rules) that govern housing; capital and labour markets; local variations in entrepreneurial abilities and cultures; and local values governing interpersonal and intergroup relationships.

(Hamid, n.d.) includes gated communities in the term “commons”. He explains that commons, in its most basic sense, it is associated with shared goods and resources among members of the same community. Since gated communities is sharing goods and services among a certain related group of people, it falls under this category.

3.2. Defining a Gated Community

Blakely and Snyder in their seminal work *Fortress America: gated communities in the United States* define ‘gated communities’ as secure housing estates ‘with designated perimeters, usually walls or fences, and controlled entrances that are intended to prevent penetration by non-residents’ (Blakely & Snyder, 1997)

The most common feature of a ‘gated’ community or any ‘gated’ housing development is a perimeter wall or fencing that envelopes and closes off the entire area of the development. Vehicular access to the development may also be restricted by a gate or a boom arm and entry is either granted by security guards stationed at the entry points or gained by entering a pin-code into a key-pad at the entryway. by use of an access card.

Security may be ensured through a variety of means:

- 24-hour security patrols by guards and ‘back-to-base’ alarms
- Panic buttons to alert security guards of a perceived security issue;
- Neighbourhood siren systems to raise the alarm in case of emergencies.
- The use of guard dogs or closed-circuit television cameras;
- Electric fencing, spikes and other forms of anti-intruder treatments

3.3. Types of Gated Communities

All walled developments and neighbourhoods with security guards do not look alike or serve the same market in the same ways. Various studies define and describe gated communities in various light. Some positive some negative. Here, the types and typologies of gated communities is discussed as per the review by (Grant & Mittelsteadt, 2004).

Type	Features	Subtypes	Characteristics
Lifestyle	These projects emphasize common amenities and cater to a leisure class with shared interests; may reflect small-town nostalgia; may be urban villages, luxury villages, or resort villages.	Retirement	age-related complexes with suite of amenities and activities
		Golf and leisure	shared access to amenities for an active lifestyle
		Suburban new town	master-planned project with suite of amenities and facilities; often in the Sunbelt
Prestige	These projects reflect desire for image, privacy, and control; they focus on exclusivity over community; few shared facilities and amenities.	Enclaves of rich and famous	secured and guarded privacy to restrict access for celebrities and very wealthy; attractive locations
		Top-fifth developments	secured access for the nouveau riche; often have guards.
		Executive middle class	restricted access; usually without guards
Security zone	These projects reflect fear; involve retrofitting fences and gates on public streets; controlling access	City perch	restricted public access in inner city area to limit crime or traffic
		Suburban perch	restricted public access in inner city area to limit crime or traffic
		Barricade perch	closed access to some streets to limit through traffic

Table 1 General Typologies of Gated Communities

Firstly, discussed are the general typology of gated communities. Here, Table 1 describes the three general typologies based on features and characteristics described by (Blakely & Snyder, 1997) in their pioneering work ‘ Fortress America: Gated Communities in the United States’.

The three general typologies of gated communities are:

- Lifestyle Communities
- Prestige Communities
- Security Zone Communities

3.3.1. Lifestyle Communities

In lifestyle communities, the gates provide security and separation for the leisure activities and amenities offered within. These projects emphasize common amenities and cater to a leisure class with shared interests; may reflect small-town nostalgia; may be urban villages, luxury villages, or resort villages. There are three distinct types of lifestyle community

- The retirement community
- The golf and leisure community
- The suburban new town.

The retirement community, is developed for middle and upper-middle class retirees who want structure, recreation, and a built-in social life in their early retirement years. Many of these developments start out as second homes to which their owners eventually retire permanently. As a result, these developments often contain both part-year and year-round residents.

The golf and leisure community is exemplified by the golf course and tennis club that are central features. Recreation spots, leisure sports, comfortable amenities integrated in the community for shared access for the residents define these communities. These developments have been noted for their retirement and leisure orientations for many years.

The suburban new town is a new class of suburban lifestyle community. They are large, comprising as many as several thousand housing units, and attempt to incorporate both residential and commercial/industrial and retail activities within or adjacent to the development. New towns are not new; but the gating of their residential areas is. The complex may contain both gated and non-gated areas.

3.3.2. Prestige Communities

Prestige communities are among the fastest-growing development forms. Their gates symbolize distinction and prestige and create and protect a secure place on the social ladder. They lack the recreational amenities of the lifestyle communities, often differing little from a standard residential subdivision except for their gates. The gates are motivated by a desire to project an image, protect current investments, and control housing values.

They include:

- the enclaves of the rich and famous;
- developments for the top fifth, the very affluent;
- executive home developments for the middle class.

The enclaves rich and famous are the communities with small compounds of privacy for celebrities and the gated enclaves of the very rich. Highly exclusive, often hidden and heavily defended, they are the model for all the gated communities proliferating across the world.

The top-fifth developments are meant to confer some of the prestige of the rich and famous enclaves to those with less exclusive status. The intention is also in part to artificially induce community, where physical security and social security are enhanced both by sameness and by controlled access. Top-fifth developments are designed for senior executives, managers, and other successful professionals. They feature elaborate gatehouses, monumental entrances, and prestige amenities such as artificial lakes or carefully preserved natural features such as ocean or river fronts and woods.

The executive home developments for middle class are communities that are the scaled down versions of top-fifth developments, they are sold by developers as "executive," although they are really just middle class subdivisions. These are a growing and ever more prominent form of development in many metropolitan areas around the globe. These are also the primary development sold as housing developments in Kathmandu.

3.3.3. Security Zone Communities

In security zone communities the fear of crime and outsiders is the foremost motivation for defensive fortification.

This class includes three types:

- the city perch,
- the suburban perch,
- the barricade perch.

These are called perches because it is not the developers who build the gates but the residents, who are often desperately trying to maintain and stay in their neighbourhoods. The residents retrofit their neighbourhoods with gates or barricades, erecting fortifications to fend off or regain control from some outside threat. By marking their boundaries and restricting access, they attempt to build and strengthen the feeling and function of community in their neighbourhood. Security zone gating and street closures occur at all income levels and in all areas. The disruptions caused by crime and traffic that their residents fear may be real or perceived, near or far; the important point is not whether they need to cut off access to their streets, but that they feel they must.

The city perch is the gates erected by the residents in the city neighbourhoods in search of security. In the city, neighbourhoods from the most affluent to the most desperately poor are looking to gates as a way to hold off the urban disorder they see around them. Sometimes the threat is on their own doorsteps, sometimes a number of blocks away. Creators of the city perch are looking to protect themselves from crime and from traffic, wanting their homes secure, their streets safe to walk on, their children protected from speeding cars and predators. Sometimes unwilling, sometimes unable to flee to the higher ground of the suburbs, they fort up in place.

The suburban perch is a more recent but growing phenomenon, as more and more of the problems previously thought of as urban occur in the suburbs and smaller towns. In some cases, as the inner suburbs age and urbanize, the quality of life their residents once enjoyed deteriorates. Sometimes residents of older suburban subdivisions fear that

they will be next and move to gate their entrances before real trouble reaches their doors. As with the city perches, the danger or threat may be more from traffic rather than crime, as residents fear the impact of overburdened residential streets on their quality of life.

The barricade perch is the fastest-growing type of community in the security zone category. Barricade perches are not fully gated communities; they are not completely walled or fenced and all entrances are not secured with gates. Instead they use barricades to close off some streets. Barricade perches are intentionally designed security settlements with restricted access to normally public spaces. Partly because of the expense, but often because the neighbourhoods exist on public streets, their complete closure is impossible. The barricades create a suburban cul-de-sac pattern out of the city grid and leave just one or two entrances to the neighbourhood. The effect is as close to full gating as is practicable.

3.4. Features of Gated Communities

There are several functions and variables that differentiate the kinds of gating. Grant and Mittelstadt describe and elaborate eight factors that differentiate gated communities. (2004, pp. 917-918)

These characteristics are based on the following factors.

- Functions of enclosure,
- Security features and barriers,
- Amenities and facilities included,
- Type of residents.
- Tenure,
- Location,
- Size,
- Policy context.

These eight features and dimensions defining and differentiating gating are elaborated in Table 2.

Function of enclosure	physical	economic	social	symbolic
	secure people and property create identity for project	enhance property values protect club amenities	give visual or spatial privacy control those inside	display status and power control those outside
Security features	<i>nature of boundary</i> wall low fence, chain, or bollard faux guard station hedge or vegetation swing-arm gate <i>nature of security</i> guards at all times auto opener entry	fence—opaque fence—barbed mirrored glass on guard house topographic feature lift-arm gate patrolling guards surveillance cameras	physical fence—visually open speed bumps or chicanes 'private property' signs water slide gate devices in road bed card entry armed guards	symbolic fence—electric pavement texture or colour 'no parking' signs desert swing gate guards at designated times code entry house alarms
Amenities and facilities	private roads open space institutional facilities	meeting place landscape maintenance guards	activity centre quality design	recreational facilities commercial facilities
Type of resident	homogeneous by age	homogeneous by class	homogeneous by ethnicity, race, status	shared activity (for example, golf)
Tenure	principal residence fee simple ownership	secondary residence condominium ownership	seasonal residence land lease	public housing rental
Location	urban infill	suburban greenfield	exurban resort destination	rural inner-city
Size	cul-de-sac pod	neighbourhood (tens to hundreds of units)	village (hundreds of units, some commercial)	town (thousands of units and mix of uses)
Policy context	restricts gating	enables gating	growing area	stable or declining area

Table 2 Features Defining Gated Communities

Function of enclosure

Although walls and gates may look similar across cultures, they have a range of functions: physical, economic, social, and symbolic. An enclosure affects the way that people navigate and use space.

Enclosures in lifestyle community limits access to shared amenities within the walls. They restrict club goods to community members and for seasonally occupied homes, the gates also limit off-season vandalism and theft. For prestige developments it is mainly protecting property values. Walls and gates also provide visual separation. Security zone developments have defensive functions. In communities around the world, people have used fences and walls to offer domestic security. In nations plagued by violence or war, walled camps may develop to separate feuding peoples, or to control subject or dangerous peoples. Walls have also been built in history for demonstrating power and authority.

Security features

There are various types of gates and guarding, different nature of the boundaries used, and a wide range of security features found today.

Nature of boundary

Boundaries around communities serve several functions: they create visual screening, permit privacy, define property, and limit access. Some are easily permeable, whereas others are high or opaque. Some create character and identity, whereas others inspire fear and loathing. Some are physical, whereas others may be psychological or symbolic.

In many cases boundaries do not prevent access for non-residents, but they regulate the degree of difficulty of access and the distance from any public goods which non-residents may want to share. In some cases, barriers do not inhibit pedestrian movement, but simply prevent cars and trucks from entering. Some neighbourhoods find strategies for discouraging visitors without applying full gating. Faux-gated entries employ structures to give the appearance of guard houses and discourage entry to people not from the area.

They have also differentiated gated communities as per types of enclosure, as mentioned in Table 3.

Type	Boundary	Road access	Notes
Ornamental gating	no marked boundary	landmark gates at entry	Feature gates showing the subdivision name are placed at the major entries to give identity to an area.
Walled subdivisions	opaque fence or wall	open	Fully walled subdivisions are a common suburban feature in western Canadian cities. Cars and pedestrians may enter.
Faux-gated entries	opaque wall or fence	narrowed entry, removable chains or bollards, guard house	Some subdivisions have physical features that look like guard houses or private entries to discourage uninvited vehicles from entering.
Barricaded streets	no marked boundary	public streets closed by fences, planters, or concrete barriers	Many cities barricade streets creating cul-de-sac streets within the grid as a form of traffic control. Pedestrian access remains open.
Partially gated roads	no marked boundary	lift or swing arm	Rural cottage subdivisions may feature gates that are only closed for part of the year. Communities on First Nations Reserves may have gates but no walls. Pedestrian access is open.
Fully gated roads	natural features such as water or ravines	lift or swing arm	Prestige communities on islands, peninsulas, or remote areas may limit access through combined natural and man-made features.
Restricted entry bounded areas	fence or wall, and/or natural features that limit access	gate with limited control access	Suburban communities may completely restrict public access; video or telephone systems may allow visitors to be vetted by residents.
Restricted entry, guarded areas	fence or wall, and/or natural features that limit access	gate with limited control access; security guards, police or army	Suburban communities may completely restrict public access; video or telephone systems allow visitors to be vetted by residents. US-style gated communities have guards at the gates or patrolling the premises. In some zones guards may carry automatic weapons.

Table 3 Classifying Gated Communities as per 'Enclosure'

Nature of security

Features that provide security, privacy, and control are central to many gated communities. Gated communities in insecure areas tend to employ more expensive and extensive security devices than gated communities in low-crime areas. Where gating is used as a niche marketing strategy, for instance, it may involve only a simple lift or swing gate that impedes car entry by strangers. Some projects have 24-hour-a-day roving armed guards and video surveillance. Devices in the road bed may puncture the tires of vehicles trying to crash through the gates. Homes have private alarms tied in to central security services. Although such measures may reassure residents that their homes provide sanctuary from the risks of the world, they also expose the fear of community members.

Amenities and facilities

Enclaves range from having few amenities to constituting complete towns. Seasonal cottage developments may have private roads that are impassable in winter when routes are covered with snow, and full-service master-planned communities offer shopping malls, schools, industry, recreational departments, and police. The availability of amenities and facilities within the enclave may affect the degree of interaction with the world outside, and so has major implications for social integration and exchange.

Type of residents

Those inside the walls of contemporary gated enclaves fall into two categories. Those who move into walls by choice are typically economically privileged, sometimes ethnically or age segregated. Gated communities may provide a means for people to separate themselves from the unknown or feared other, or to congregate with others who share their world view. Those who move into a gated community out of force may be refugees or captives.

Tenure

The suburban new gated communities in are primarily first homes for the owner-residents. We can also see, however, a many second-home gated market. Some owners buy residents as holiday homes while others occupy homes just as an investment in real estate.

Location

Most of the gated communities are known to be found in urban or suburban sites. While there are some enclaves that may also appear in exurban¹ areas and rural regions. Location is clearly tied to other variables that drive gating. For instance, fear of crime and rates of crime vary. Extreme poverty, violence, and lawlessness occur more commonly in some parts of the world than in others, thus encouraging those with means to look for residential solutions to the threats they face.

Size

The size of the enclosure clearly affects social functions and characteristics. Some enclaves are small developments of only a few houses; these tend to have few common amenities other than the road and wall. Others may be neighbourhoods of dozens of homes, with shared facilities such as a club house or swimming pool. Village-sized developments will have limited commercial uses. A few gated communities are the size of towns or cities: they have a full suite of facilities and may incorporate as municipal units. The size affects not only the kinds of amenities in the settlement, but also the way in which residents interact, and the level of security provided. The larger the settlement, the greater the chance that it reflects some level of social or economic diversity, and that it may become all-encompassing in meeting residents' needs. In the largest enclaves, residents may virtually secede from public life outside.

¹ An exurban area is an area outside the typically denser inner suburban area of a metropolitan area, which has an economic and commuting connection to the metro area, low housing density, and growth.

Policy context

The policy context of a place affects how and under what conditions communities can close themselves off from others. Some jurisdictions place few limits on gating, or lack the police powers to prevent neighbourhoods from enclosing themselves. Some cities essentially encourage it. In other areas local policy may restrict or limit gating.

Some gated communities have their own management, first under the project developer, and later under homeowners' associations. The association provides services that in cities would be the responsibility of local government. This policy context reflects a distrust of government and a weak planning regime that can enhance commitment to the private community. Projects that provide their own local services ease pressure on governments which currently lack resources to provide adequate urban infrastructure. In the process the gated community grows distant from the public realm and the rules that govern it. Nations with a strong tradition of local land-use planning or highly centralized planning authority may react differently to proposals for gated communities than do nations with a policy in minimum interference from governments on private transactions.

As authorities look at developing policy to control or manage gated communities, they have to consider several questions about the potential of the strategy to meet local objectives. Is the project self-governing or a residential enclave within an established political unit? How does the settlement integrate with the larger community? What impact will gating have on the larger community? How might it affect traffic and crime patterns? Will it contribute to urban fragmentation, social segregation, and perceptions of crime? Because communities find different responses to these questions, their approaches to gating vary. (Grant & Mittelsteadt, 2004)

3.5. Social Divide

Gated communities are secluded and are facilitated with security and various other amenities managed by a community body of governance. The area is cordoned off, well maintained and made to feel like a different area compared to the outside locality. This creates a difference in the social structure and mentality. The differences in their social structure could be a crucial factor in explaining the level of urban inequality, the

symbolic distance between the groups and differences in residential mobility. (Ruoppila, 2006)

Residents of these communities living in a guarded, protected and well maintained parcel of land are considered “well off”. They are considered the elites and the privileged. This mentality suggests that the residents have a higher perceived income over residents outside the locality. This is mostly untrue. However, this is not what is perceived. The perception of unfair advantage and privilege is abundant in this topic of discussion. If the perception were to change or some sort of access or benefit given to the public/locals by the developers and buyers of said gated community, the perceived level of fairness and society would increase. And higher levels of perceived fairness cause higher levels of utility, and lower preferred levels of income redistribution. (Bjørnskov, et al., 2010)

3.6. Rise of Gated Communities

Gated communities are a very popular form of development in the United States, South Africa, Mexico and Latin America. However, it is difficult to know how many people reside in gated developments, primarily because comprehensive surveys have not been undertaken. (Low, 2003) estimates that 16 million people in the United States live in gated communities. In comparison, a survey conducted in 2003/04 of the English planning authorities to collect factual details of gated communities, indicate that there are approximately one thousand gated communities in England. (Blandy, 2007)



Figure 4 Gated community in South Africa



Figure 3 Preston Oaks Gated community in Buffalo, NY

The popularity of gated developments is explained in different ways throughout the world. In America, for example, they have risen in popularity over time due to change in social class, race and ethnicity. It is a result of the conflicting or even polarizing social values that make up the moral terrain of the middle class and a general anxiety promoted by the media and government (Low, 2003). In South Africa, relaxation of restrictions on the mixing between races, and a desire for white South Africans to protect themselves from crime, resulted in the emergence of gated communities. (Jürgens & Gnad, 2002)



Figure 5 Stonebrook Falls Gated community in Lebanon

In Latin America, security compounds are a means by which the rich can separate themselves from the poor (Roitman, 2005) and local governments often welcome the much needed investment in their local area (Libertun De Duren, 2006). Residential areas in Mexico are being gated illegally because crime rates are high and the police do not provide adequate protection (Low, 2003). The civil war in Lebanon during the 1980s lead to an increased demand for ‘enclaves where a secure supply of water and electricity was guaranteed’ (Glasze & Alkhayyal, 2002) Likewise in Russia, it is pointed out that ‘security’ in gated estates implies more than just the protection of life and limb. It also includes the



Figure 6 Paradise Village Gated community in Mexico



Figure 7 The Pine Gated community in Hull, England

guarantee of the long-term functioning of ‘normal’ residential infrastructure, e.g. the provision of water, gas, electricity, heating, regular waste collection, lift maintenance and so on – services which frequently failed in formerly state owned and now municipally owned housing in the period of transformation’ (Lentz, 2006)

3.7. Housing Scenario and Development in Nepal

Developing countries like Nepal were initially left out of such gated developments. It was only during the late 1990s and early 2000s that small-scale gated communities started appearing in Kathmandu valley. Locally referred to as ‘colony’ or simply ‘housing’, gated communities in Nepal have been limited to roughly 50 to 250 units, so far with relatively limited mixed-use character and amenities. Unlike an orthodox gated community, these housings are not strictly self-governed or fully provisioned.

They do qualify to be called gated communities, because they are gated and they are walled. Fundamentally, the primary focus is mostly always on the physical aspect of these entities, such as walled perimeter, restricted access, amenities within them, and isolation from the outer world. However, they are different from the much celebrated gated communities around the world. (Thapa, 2017)

Kathmandu valley saw a major housing deficit in the past few decades. This is due to a combination of three factors. First, there have been various phases of transition. Politically speaking, this involved the end of the Rana dynasty in 1951 A.D., the restoration of a multiparty democracy system in 1990 A.D., the Maoist armed struggle in 1996 A.D., the people’s movement that abolished the monarchy and the peace agreement with the Maoists in 2006 A.D. Natural disasters also caused great transition because of the loss of properties and homes, environmental degradation and low socio-economic development in rural regions. There was a large population migrating into the Kathmandu valley seeking better economic and educational opportunities as well as health, safety and other services not easily available or accessible in other parts of the country. Instead of regulating this trend of urbanization, successive governments adopted a centralizing policy and concentrated development projects within the valley, causing a 6% annual urban population growth, against the national average of 2.1%, and resulting in the population of Kathmandu valley to be about 30.9% of the total

national urban population. The available developed land, extended infrastructure and constructed housing did not meet the demands of the ever-increasing urban population, resulting in a growing number of vehicle registrations and haphazard expansion of settlement in the Kathmandu Valley. The following are some of the driving forces influencing the dynamic pattern of urban growth in the valley: physical conditions, public service accessibility, economic opportunities, land market, population growth, political situation, and plans and policies.

Second, urban poverty and the increasing gap between rich and poor have constrained the accessibility and affordability of housing. Nepal was one of the poorest countries in the world, with a per capita income of NPR 20,543 (\$278 in 2003–2004) according to CBS, 2004. In the capital city of Kathmandu, the urban poor was estimated to represent about 15.1% of the city's population. Disparity in income levels is very high, a lot of people in Kathmandu live in rental housing. There were only 17 squatter settlements in the valley in 1985, and in 2003 that number had increased to 64 according to Lumanti Support Group for Shelter. In a span of 18 years, the squatter population increased from 2,134 to 14,500, almost a sevenfold increase. Popularly known as landless settlements, squatter developments have provided housing for around 2,600 families or 14,500 people. More than half of the population of the large squatter development close to the urban centre consists of migrants or the low-income group that was displaced from the city centre when many ground-floor apartments were converted into shops.

Third, until recently, construction of a house in Nepal was entirely the responsibility of the individual or family. In such an owner-built informal housing development system, individuals first acquire a plot of land through their own finances and then build a house themselves. All of the infrastructure required for the land and house will be managed incrementally through cooperation with the neighbours. The dwelling units are built and expanded incrementally over a period of time as both the family size and income increase. Due to these factors there was a massive deficit in housing in Kathmandu Valley.

Impact of Gated Communities on Local Mobility

Project name	Project area (ha.)	Plots (n)	Land owner (n)	Implement period (yrs.)	Proposed time period (yrs.)	Completed (yrs.)	Delay (yrs.)	Implementing agency
Sainbu	22.5	760	536	1991–2003	5	12	7	TDC, Lalitpur
Dallu	20	691	455	1991–2003	5	12	7	KVTDC, Kathmandu
Kamal Vinayak	7.3	205	170	1991-1996	2	5	3	TDC, Bhaktapur
Gongabu	14.4	406	376	1988-1996	4	8	4	TDC, Kathmandu
Nayabazar	44.25	1569	1312	1995-2003	4	8	4	KMC
Liwali	34	770	667	1995-1998	3	3	0	Bhaktapur Municipality
Gopikrishna	10.9	292	242	1995-2002	2	4	2	TDPIC
Sinamangal	36	1070	964	1995-2003	4	8	4	TDPIC
Sinchitar	26.9	920	812	1996-2003	4	7	3	TDPIC
Lubhu	13.5	243	207	1993-1996	2	3	1	TDPIC
Bagmati Corridor	9.8	258	239	1992-2001	2	9	7	TDPIC
Total	239.55	7184	5980					

Table 4 Completed housing projects in the Kathmandu Valley between 1988-2003 (Shrestha 2010)

Following the increased resentment of the landowners, the Kathmandu Valley Town Development Committee (KVTDC), after enactment of Town Development Act 2045 B.S. (1998 A.D.), implemented two models of land development based on a participatory approach: Guided Land Development (GLD) and Land Pooling. Under GLD, the access roads were either improved in already existing areas or new access roads were created in previously inaccessible lands through the contributions of the landowners. In between 1988 to 2003, the completed 11 land-pooling projects successfully developed about 240 ha of land and provided 7,184 housing units and other plots benefiting 5,980 landowners (Table 4). These completed projects have also contributed 82.27 ha of land in total for roads, open spaces and reserve plots. All of the development costs including infrastructure provision were covered by selling the reserve plots (18.98 ha in total) to the highest bidder. In addition to all this, the local

real estate and the individual land brokers made a significant contribution on land availability compared to that of the government's efforts. Private owners also supplied rental housing that helped fulfil the housing needs the urban population of the Kathmandu metropolitan area. (Shrestha, 2010)

In the 1970s land use plans for all the five regional centres were prepared and includes detailed physical development plan of government's institutional area. Also a number of towns were established in Terai by clearing some forest lands and attempts were made to implement a physical development plan in Kathmandu Valley including three sites and services projects. There have been a series of plans prepared in the case of Kathmandu Valley, and some other towns like Birgunj and Biratnagar. However, they were not implemented. Since then no comprehensive planning effort has taken place in Nepal's urban areas. Land is mostly developed by individual's decisions with a mixed residential-commercial land use pattern. (Steekelenburg, Ester van ; CIUD, 2010)

Private developers are a recent phenomenon in Nepal. The high influx of population to cities, particularly in Kathmandu Valley and other prominent cities like Pokhara and Birgunj during and after the ten-year long insurgency in the country, the remittance fund inflow from the workers outside the country, availability of housing loans, and improvement in construction technologies saw a slowly emerging formal housing market. In the mid-1990s, the government began to encourage private-sector investment in land and housing development with the promulgation of The Ownership of Joint Housing Act 2054 B.S. (1997 A.D.) (The Apartment Ownership Act), that provided the legal framework for development sales and management of multi-story buildings and paved road for private sector developers to enter into the housing sector. (Steekelenburg, Ester van ; CIUD, 2010)

The Ownership of Joint Housing Act 2054 B.S. (1997 A.D.), which was only finalized in 2003 due to legal and administrative obstacles. Within a span of 2 years (2003–2005), as many as 15 housing companies were sanctioned by the KVTDC for the development of housing units (independent, duplex and apartment types) in the valley. Over a 3-year period, 14 private housing programs produced about 965 dwelling units on 254.3 ropani of land. In response to the public's overwhelming approval of the program, over 150 real estate companies have since registered with the Nepal Land and Housing

Development Association as on 2010 A.D. Among them, about 40 to 50 of those companies were registered as Housing Developers and were engaged in various types of developments, each with variation in design, facilities and prices. Some developments are in the planning phase, others are under construction, and still others are in the marketing and sales stage. In 2007, at least 16 apartment buildings and four housing projects were registered for approval in Kathmandu alone. This number saw a rising trend. Currently however, right after the Covid-19 crisis, the number of companies registered with the NLHDA have gone down to 97 members. (NLHDA, 2020) Real estate companies are finding it difficult to develop comprehensive housing programs because of the bureaucracy involved: having to go to the Ministry of Population and Environment for environmental impact assessments, the KVTDC for planning permits and the municipality for building permits. Such delays have created uncertainty in the real estate business and high costs of housing units. (Steekelenburg, Ester van ; CIUD, 2010)

Almost all of the private sector housing developments were constructed using reinforced concrete frame structures and had provisions for parking. Electricity and telephone lines were provided by the Nepal Electricity Authority (NEA) and the Nepal Telecommunication Corporation (NTC). Water was pumped from groundwater sources. Depending on the quality of the development and the target groups, other facilities such as swimming pools, gymnasiums, saunas and whirlpool rooms were provided within the housing complexes. User committees were formed to manage solid waste disposal and maintenance of the buildings. (Shrestha, 2010)

3.8. Gated Communities in Nepal

Kathmandu Residency is the first apartment housing to move towards establishing sustainable real estate industry from *Ansal Chaudhary Company* in 2000 A.D. The project comprised a total of 180 apartments. (Steekelenburg, Ester van ; CIUD, 2010) In 2001, *Civil Homes* took the first big leap in group housing by building 55 houses in Bhaishapati. (Newar, 2004) With the enactment of Apartment Ownership Act in 1997, legal framework for development, sale and management had been established. This act has been instrumental in initiating a formal housing market in Nepal where developers, design consultants, contractors and bankers have their own role to play. The bankers

have found a new avenue for investment (both for builders and prospective buyers). Similarly, designers have found housing as a reliable job and an opportunity to express their creativity and innovation. Housing developers have been successful in creating a



Figure 8 Kathmandu Residency, Bagdole, Lalitpur (The first gated community in Kathmandu)

new kind of business entrepreneurship in the country that can guide planned urban development by the private sector. Investors are finding housing as an attractive area for investment because of its expanding market and lucrative return. (Hada, 2012)

Since then, around 150 private companies have registered with Nepal Land and Housing Developers' Association, out of which most are working in Kathmandu, Pokhara and Bharatpur. Among them only 40 to 50 that focus on the residential sector, the majority caters for the public, utility and office sector. Out of the 40 the majority (around 30) can be characterised on one-off developers, they essentially just completed one project, only 10 have built a successful real estate developer's business model.

As of yet the supply of housing estates and modern apartment complexes is mainly geared towards the upper middle class, including Non Resident Nepalese living abroad.



Figure 9 Civil Homes, Bhaishipati (The first housing colony in Kathmandu)

In fact, many of the developers specifically target the latter group and organise housing expositions in America and Australia as part of marketing programme, to attract their clients. (Steekelenburg, Ester van ; CIUD, 2010)

3.9. Mobility and Accessibility

Mobility represents the essence of mankind's continuous development, based on the transportation of people and goods on different ways. Road transportation plays a vital role in satisfying the mobility needs of modern society. Nowadays, we witness a major road system expansion designed in order to satisfy both economic and social aims of road transportation. (Iliescu & Boitor, 2013). For urban areas, mobility serviced by roads is a means for people to commute to work places, shopping centers, leisure facilities, hospitals or any destinations. Therefore, the necessity of a suitable transport development, traffic management and traffic safety in the city stand as a very important job for the authorities. (Iliescu & Boitor, 2013)

Accessibility is the first goal of the present sustainable orientation of the urban mobility planning promoted worldwide. (Iliescu & Boitor, 2013) Accessibility and ease of access, in an urban context is the measure of how easily or if at all, a person can reach or access any services, infrastructure and facilities in the urban area. This can be secured and insured by proper design and procedures, which are supporting needs of possibly

the biggest group of users. (Zajac, 2016) This may be via policies, plans, regulations, design considerations or even general awareness and civic sense of the general public.

Accessibility and availability of transport both public and private is becoming an important problem, especially for city planners and public transport experts. This topic is also highly promoted by European Commission (COM 2011/898), which distinguished the following elements of passenger rights, strictly bound with accessibility:

- non-discrimination;
- accurate, timely and accessible information;
- immediate and proportionate assistance. (Zajac, 2016)

3.10. The Concept of Social Justice

The notion of social justice is relatively new. The concept first surfaced in Western thought and political language in the wake of the industrial revolution and the parallel development of the socialist doctrine. It emerged as an expression of protest against what was perceived as the capitalist exploitation of labour and as a focal point for the development of measures to improve the human condition. It was born as a revolutionary slogan embodying the ideals of progress and fraternity. By the mid-twentieth century, the concept of social justice had become central to the ideologies and programmes of virtually all the leftist and centrist political parties around the world, and few dared to oppose it directly.

In the contemporary context, social justice is typically taken to mean distributive justice, which is often identified with unqualified references to justice. To support the concept of social justice is to argue for a reconciliation of the priorities within the context of a broader social perspective in which individuals endowed with rights and freedoms operate within the framework of the duties and responsibilities attached to living in society. Notwithstanding the implied associations between social justice, redistributive justice, and justice as a more general concept. (DESA, 2006)

4. CASE STUDIES

Two types of case studies i.e. national and international have been applied for the research.

4.1. Lajpat Nagar IV, New Delhi

Lajpat Nagar is located 13Kms to the east of Indira Gandhi International Airport in Delhi. The area covers a total of 293 ha and is divided into four parts: Lajpat Nagar I, II, III (north of the Ring Road) and IV (south of the Ring Road). Housing colonies like Amar Colony,

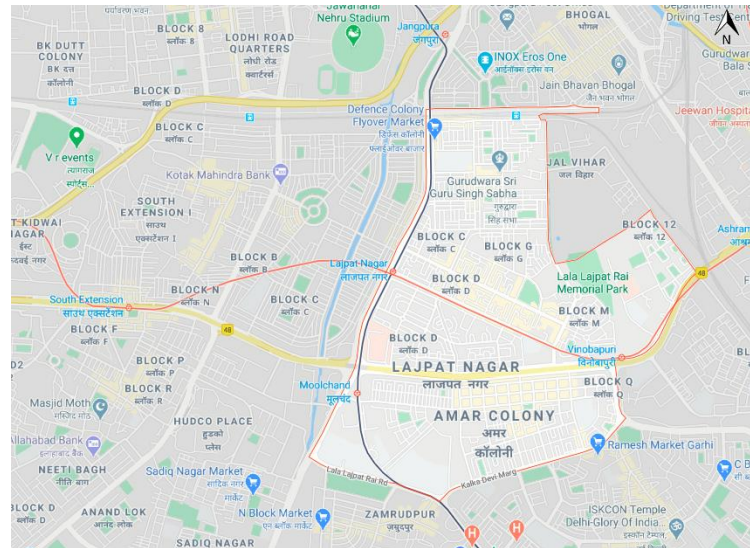


Figure 10 Lajpat Nagar, New Delhi (Location Map)

Dayanand Colony, Double Storey (also known as Nirmal Puri), National Park and Vikram Vihar are also located in it. Here, Lajpat Nagar IV is focused on. This is the 103 ha of area towards the south of the whole Lajpat Nagar area. It is the part of Lajpat Nagar south of Mahatma Gandhi Marg and north of Kalka Devi Marg.(Figure 10)

4.1.1. Site Design and Security Features

Lajpat Nagar was developed in the 1950s with its early residents, the Hindus and Sikhs moving east from newly formed Pakistan following the partition of India in 1947. Initially, refugee camps were set up and refugees were allotted plots in areas like Lajpat Nagar, Patel Nagar, Rajendra Nagar. The plots were of 15x60 feet constructed like army barracks. The houses were all single story, with asbestos roofs, in the beginning, but now most of the houses are multistoried in this neighborhood. In the recent years, Lajpat Nagar has become a preferred residential neighborhood for tourists and certain refugees from various countries.

Lajpat nagar IV has a six residential colonies integrated in it. Vikram Bihar, Nirmal Colony, Double Storey, Dayanand Colony and Amar Colony occupy the area. spread within these colonies are are various community facilities and amenities like parks, schools, colleges, restaurants, banks, clinics, shops among others. But since these colonies are bordering one another, to make mobility easier and increase accessibility, they are interconnected and thorough fare is allowed. The gates are guarded but open during the day. These gates close only at night. They do not have complicated or sophisticated surveillance system.



Figure 11 Lajpat Nagar IV (Blocks and Connection)

Lajpat Nagar IV is surrounded by Roads however to access one road from another would not be possible as the area is occupied by multiple gated colonies bordering one another. To solve this issue, these communities are divided into blocks. These blocks are then gated and secluded. The other roads are made open to the public during the day when a guard is stationed at the gate and thorough fare is allowed. The colonies are also interconnected among themselves. These gates are then closed at night to maintain security within the colonies. Lajpat Nagar increases mobility and accessibility in this manner.(Figure 11)

4.2. Raleigh Park, Kensington

Raleigh Park is located on a 12.34ha site 3 Kms to the south of the Sydney CBD. The development is sited on the former W.D. & H.O. Wills tobacco factory site adjacent to the Moore Park Golf Course and Moore Park Supercenter. (Figure 12).

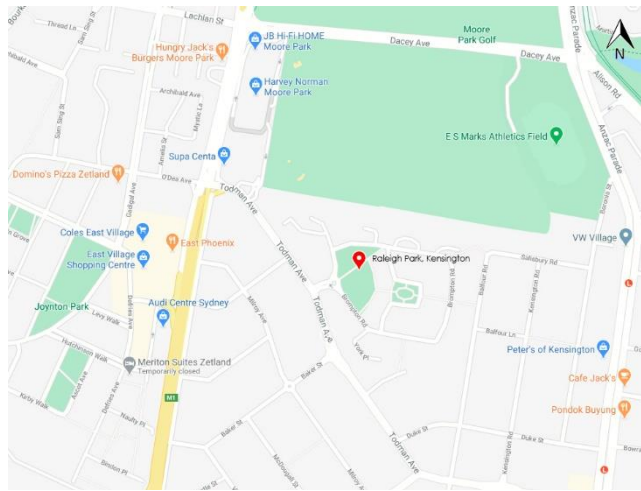


Figure 12 Raleigh Park, Kensington (Location map)

In 1989, Randwick City Council granted development consent to the Mirvac Group and Westfield Design and Construction for the development of approximately 150 Torrens-title² dwellings and 350 Strata-titled³ apartments in six towers on the site (Figure 12 Figure 13). Raleigh Park was the first site to be developed under Community Title legislation in NSW. The detached and attached low density dwellings are Torrens



Figure 13 Raleigh Park, Kensington (Areal view)

Titled and each has joint ownership of the community facilities. The apartments are Strata Titled with a common pool for each building and shared ownership of the community tennis courts. Unlike recent Community Title developments, the roads within Raleigh Park are owned and maintained by Randwick City Council.

² Torrens title, a South Australian invention, is a system where land ownership occurs when the document that transfers ownership of the property is filed at the local Land Titles Office. The purpose of the Torrens system is to provide certainty of title to land.

³ Strata title is a form of ownership devised for multi-level apartment blocks and horizontal subdivisions with shared areas. The word "strata" refers to apartments being on different levels.

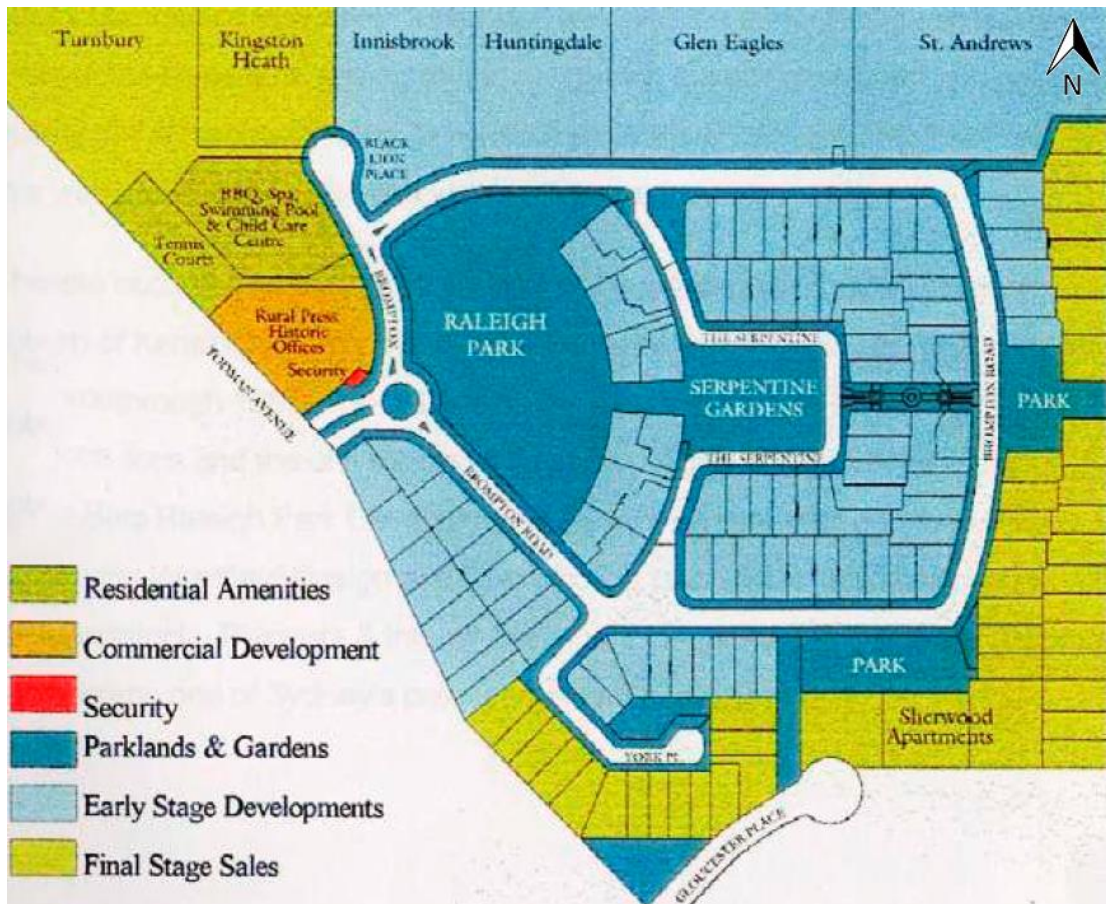


Figure 14 Raleigh Park, Kensington (Master Plan)

4.2.1. Site Design and Security Features

The Raleigh Park development was designed to retain features of heritage significance, including the factory administration building, perimeter fences and gates and fig trees (Quintal, 2006) (Figure 17). The development features three parks, eight swimming pools, two tennis courts, a child care center for sixty children and a shop.



Figure 15 Guard Station in Raleigh Park

Detached townhouses are located in the development as well. (Figure 16)

Internal roads service all other townhouses and the multi-unit apartment towers (Figure 14). The towers vary in height from eight to thirteen story and are located along the northern boundary of the site fronting the Moore Park Golf Course.

Raleigh Park is not ‘gated’, however it is enclosed by a 1.8 meter perimeter fence comprised of rendered brick columns and decorative steel panels (Figure 16). The original factory gates and fences have been retained at the vehicle entrance and whilst they cannot be closed, they give the impression that the estate is ‘gated’ (Figure 16). Adjacent to the entry is a security station manned by a guard who patrols the streets twenty-four hours a day. Closed-circuit television cameras transmit images to the security station to enable the monitoring of activity within the estate. Signage throughout the development warns visitors that security guards and cameras monitor the development (Figure 15). All dwellings have alarm systems connected to the security station or external security companies.



Figure 16 Perimeter Fence and Typical House in Raleigh Park



Figure 17 Entrance to The Raleigh Park

4.3.1. Site Design and Security Features

Macquarie Links contains over 350 dwellings, comprising a mixture of low density detached housing and multi-storey apartments (Figure 21, Figure 24). Community facilities include swimming pools, tennis courts, parks, barbeque facilities and a community centre (Figure 22 and Figure 23). Single detached dwellings and three storey walk-up apartments front the 18-hole golf course which divides the site and flanks the eastern boundary. A community centre and golf clubhouse are located adjacent to the golf course (Figure 25). A flora and fauna reserve is located in the southwestern corner adjacent to the tennis courts and barbeque area. A hotel precinct containing a hotel with restaurants, bars and childcare facilities is proposed in the northern part of the site adjacent to Macquarie Fields House (Monarch Investments, 2006).



Figure 21 Multi-story Apartment with Strata title in Macquarie Links



Figure 24 Detached house with Torrens title in Macquarie Links



Figure 22 Tennis court, Macquarie Links



Figure 23 Swimming pool, Macquarie Links

A 1.8 metre perimeter cyclone fence is located along the eastern and northern boundaries. The golf course (Figure 25) and flood channel to the east, and the Hume Highway to the west provide a physical barrier to access. Electronic steel gates with brick pillars adorn the vehicular entry to the site (Figure 26). Adjacent to the entry is a security station which is manned by a security guard twenty-four hours a day. The electronic gates are closed only at night; however, a boom arm across the entry driveway is permanently closed. Visitors are stopped at the gate to enable the security guard to record their licence plate and to enquire as to why they are



Figure 26 Entrance Gate, Macquarie Links



Figure 25 Golf course, Macquarie Links

visiting before entry is permitted. All dwellings have back-to-base alarm systems and telephone connections to the security station to alert the security guard in an emergency or in the event of suspicious activity. Cameras at the entry transmit images to the security station to enable monitoring of vehicular activity.

4.4. Vinayak Colony, Bhaisipati

Vinayak Colony is located on a 5.7 ha site in Lalitpur, Sainbu Awasi, Bhainsepati, 1.8 Kms to the south from ring road in Kathmandu valley. It lies near the Bhaisipati town planning area. Nearby developments include Nepal Medici Hospital, towards the north, Sainbu Awasi, Radio Nepal tower and WaiWai Factory towards the south, Civil Homes housing colony towards the east and Himal Cement Company towards the west.

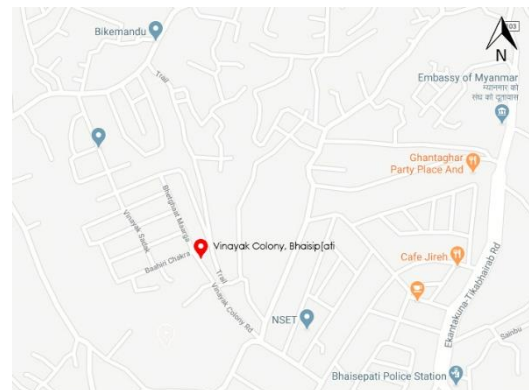


Figure 27 Vinayak Colony, Bhaisipati (Location map)

Vinayak Colony was a venture by CE Real Estate company started on late 2007 A.D. to early 2008 A.D. Six years after the first housing colony started construction in 2001 A.D. in Bhaishipati. It initially Started with 50 units as phase 1 and grew to what it is today following the overwhelming positive response from clients.



Figure 28 Vinayak Colony, Bhaishipati (Areal view and Master Plan)

4.4.1. Site Design and Security Features

Vinayak Colony contains over 195 individual housing units with a varying range of sizes. Community facilities include a swimming pools, temple, department store and a community center. The community center at the north end of the site houses the pool, health club, restaurant and multipurpose hall. The department store and playground is adjacent to it. The temple is situated to the left as one enters the site from the north entrance. The colony has an independent water supply system and generator backup for the common areas.



Figure 29 Detached Housing in Vinayak Colony



Figure 30 Swimming pool in Vinyak Colony



Figure 34 Community Center of Vinayak Colony



Figure 32 Gate and Boundary of Vinayak Colony



Figure 31 Department Store in Vinayak Colony



Figure 33 Temple in Vinayak Colony

A 2.5-meter perimeter compound wall made of a cement brick n concrete base and steel fence top, surrounds the colony with vehicular entrance gates to the north and south. Large iron gates with brick pillars and a capital stand at the vehicular entryways to the site. Adjacent to the entry is a security station which is manned by security guards twenty-four hours a day. The iron gates are closed only at night, however, a boom arm across the entry driveway is permanently closed. Visitors are stopped at the gate by the security guard to record their vehicle number plates and to enquire the reason for the visit and provide a visitors' pass before entry is permitted. Round the clock security is provided by a team of security guards stationed at each entrance and also patrolling the streets at night. The community is also fitted with the neighborhood siren system where residents can sound the alarm in case of emergencies and security risks.

4.5. Management, Restrictions and Agreements

Each of these gated communities are considerably different in all regards, including the location, scale, recreational facilities and the complexity of security measures. Despite

these numerous differences, the three communities are managed in similar ways and are all have a certain set of restrictions, guidelines and agreements.

4.5.1. Management

Raleigh Park and Macquarie Links are managed by strata management companies⁴ and are divided into several different bodies corporate based upon consecutive development stages. Vinayak Colony is managed by a HOA called the 'Vinayak Colony society', which is run solely by the residents.

The body corporate or HOA is responsible for the collection of levies and the coordination of repairs and maintenance of all the common assets of the community. Residents meet to discuss resident development proposals, maintenance issues and the scheduling of maintenance works. All residents must pay levies to ensure that there are adequate funds to meet security, maintenance and repair costs.

Macquarie Links Golf Club is managed and maintained independently of the community by ClubCorp. Memberships are available to both residents and non-residents, e.g. non-residents may become members of the golf club with the purchase of a lifetime membership of \$46,000. (Quintal, 2006) The restaurant and department stores in Vinayak Colony are run and managed independently by the respective owners and provide service only the residents of the colony.

4.5.2. Restrictions and Agreements

Each community is subject to restrictions on dwelling design, property maintenance and landscaping. In all developments there are restrictions on the colours of exterior paint, materials and requirements for the maintenance of common areas, driveways and gardens.

⁴ Strata management, sometimes known as "body corporate management", is a specialist area of property management involving the day-to-day operation and management of a property that is jointly owned and comprises multiple units, common areas and common facilities.

In Raleigh Park and Macquarie Links, external alterations to all dwellings must meet preordained guidelines and be approved by the body corporate. Driveways, roads and footpaths in Raleigh Park are subject to a prescribed paving colour and type.

In Vinayak Colony, external alterations are completely prohibited with an exception to adding a car shade made of clear acrylic sheets.

Residents of all communities, Raleigh Park, Macquarie Links and Vinayak Colony indicated that the restrictions and agreements were strictly adhered to, particularly with respect to external alterations to the residences. Raleigh Park residents acknowledged that over time residents are becoming more accepting of the need to change some of the by-laws or be more flexible, for example with respect to exterior paint schemes. Vinayak Colony residents informed that the restrictions and agreements are subject to change following a community meeting, discussion and decision when any issues arise.

All residents noted that tensions arise within the community when residents do not comply with the rules and that this was an inherent problem of community self-management.

Raleigh Park	Macquarie Links	Vinayak Colony
Pets are not permitted	The erection of flag poles and satellite dishes is prohibited	Making changes to the structure is not permitted
Vehicles are not to be parked on the road	Fencing must be constructed from brick	Vehicles are allowed to be parked on the road
Front fences are not permitted	All letterboxes must be of the same design	Car shade with clear acrylic sheet is permitted
Non-residents are permitted to use the parks	All driveways must be the same width	Non-residents are not allowed to use the community areas

Table 5. Restrictions and Agreements in Gated Communities

5. POLICY REVIEW

The Government of Nepal has prepared various laws and legislation regarding Housing and group housing. The following legal documents are prepared related to community housing, land and joint ownership.

- The Lands Act, 2021 B.S. (1964)
- Public Roads Act, 2031 B.S. (1974)
- The Ownership of Joint Housing Act, 2054 B.S. (1997)
- Building Byelaws, 2064 B.S. (2007)
- The Town Development Act, 2045 B.S. (1998)
- The Right to Housing Act, 2075 B.S. (2018)
- Land Use policy 2015 A.D.
- National Urban Development Strategy 2017 A.D.

5.1. The Lands Act, 2021 B.S. (1964 A.D.)

The lands act, 2021 B.S. was made to amend and consolidate the lands act. It provided for, the expediting the diversion of the burden of inactive capital and population from the land to the other sectors of economy in order to accelerate the pace of economic development in the country. It aimed to bring about improvements in the standard of living of farmers' dependent on land by making justified distribution of cultivable land and by making necessary knowledge and resources on agriculture easily accessible. The act also had provisions to maintain or boost the convenience and economic benefit of the public by encouraging to maximize agricultural production. The latest amendment to this act was done in 2076 B.S. to update the act and accommodate the federal government system.

The act defines 'Landowner' as "a person who has the land registered in his/her name, subject to the payment of land revenue to Government of Nepal under the prevailing law and has, by virtue thereof, the title to the land." It also defines the term 'Family', in relation to any person as only his or her relative in the status of husband or wife, irrespective of whether there has been any property division, and until the father or mother is alive, a son or daughter who has not attained the age of 16 years irrespective

of whether he has been property division. According to the act, 'Company' means any entity defined as a company in the "Company Act 2063 B.S. (2006 A.D.)", this includes private company, public company, holding company, subsidiary company, foreign company, listed company and non-profit company.

As per Chapter 3, Section 7, Sub-section (1) the upper ceiling of land allowed to be owned by a landowner, in any way, is not more than 25 Ropani in Kathmandu valley. Moreover, as per Section 7, Sub-section (2), notwithstanding anything contained in, Section 7, Sub-section (1), any person or his or her family as a land owner may own, not exceeding the upper ceiling of, 5 Ropani of land in Kathmandu valley for their housing purposes in addition to the land referred to in Section 7, Sub-section (1).

Section 12, iterates the provision for exemptions from the upper ceiling contained in Section 7. The 8th amendment of the act in 2076 B.S. (2020 A.D) Section 12, Sub-section (g) and Section 12A mentions land owned by a company or association as the landowner, exempt from the upper ceiling specified in Section 7, provided that the land ceiling is not sufficient or is inadequate for the company or association to run its operations and acquires special permission from the government of Nepal for the ownership of such land.

According to this lands act any landowner shall not own land more than 30 Ropani for any foreseeable purposes in the Kathmandu Valley.

5.2. Public Roads Act, 2031 B.S. (1974 A.D.)

The "Public Roads Act 2031 B.S." came into effect in 2031.06.20. This was made to provide for the development, maintenance and expansion of Public roads. It makes provisions to classify all kinds of public roads and acquire lands required for the development, maintenance, expansion or improvement of the public roads. It iterates laws related to collection of development tax from landholders near the roads who benefit from the public roads, in order to maintain the convenience and economic interest of the general public.

The act defines "Public roads" as "roads that are not subject to personal possession by any person." It defines the term "Road border" as a public road and the area of land as

prescribed on the right and left hand sides of the central line of such a road, pursuant to Section 3 of the Public Road Act. Section 3 of the Public Road Act classifies the road into highways, feeder roads, district roads and urban roads. It specifies the road border shall not exceed thirty-one meters on both right and left hand sides from the central line of such roads. Provided that even in relation to the whole length of the same kind of road, the Government of Nepal may, owing to the topography and habitation, specify the required border. The term "Land" mentioned in the Public Road Act means any land, and this term also includes a shed, house, building, tree etc. situated in and anything permanently fixed to such a land.

Chapter 3 Section 18 describes the power of the Government of Nepal or the Department of Roads to remove goods causing obstruction to movement on public roads. Section 18 Sub-section (4) states that in addition to any goods left, placed or thrown on the public road, anything including any arm or branch of a door, tree or wire, that is held, installed or made with a house or wall on either side of a public road as to project towards the road and causes obstruction to the movement on the road, the Department of Roads may issue an order to the concerned person to remove such obstruction or arrange the goods in a manner not to cause obstruction within a reasonable period of time as specified in the order.

Chapter 3 Section 19 states the prohibition on doing any act on public roads or road border without obtaining permission. According to Section 19 Sub-section (1) no person shall build an access road joined to a public road or dig or demolish a hole or ditch on a public road or within the road border or install or place barrier, peg or fort on the public road or build a house or shed thereon or cultivate a land within the road border or do any other similar act without obtaining the permission of the Department of Roads.

As this act defines public roads as roads not subject to personal possession by any individual or family. This implies that when a road is used for access or otherwise by more than one household or parcel of land, it is deemed public road. The act prohibits any person, individual or group to obstruct movement on these public roads in any way. It also prohibits any individual, family or landowner from doing any act as to barricade, obstruct or damage the area within the road border without permission from the

Department of Roads or the local authorities. Failure to do so shall give the Department of Road, the authority to carry out the removal or demolition of the said obstruction, by their own employees or others on a contract basis.

5.3. The Ownership of Joint Housing Act, 2054 B.S. (1997 A.D.)

This Act was passed on 2054.09.07. It was passed to provide for the ownership of joint housing. Due to overpopulation in urban areas of Nepal, there is an increment in the price of land depriving housing facilities to many residents of the cities. To solve the housing problem, the concept of joint housing was introduced, whereby arrangements were made for selling apartments in a planned manner. The act ensures rights and duties in such apartments.

Chapter 1, Section 2 provides the definition for ‘Joint Housing’ as meaning and including any building consisting of two or more two apartments with two or more floors built on a plot of land and two or more than two buildings designated as a block, pocket or any building of a similar designation and the land, compound and complex ancillary thereto. It defines ‘Apartment’ as a unit of a building consisting of one or more than one rooms that could be used independently in a joint housing along with collective areas and facilities. According to the act, ‘Promoter’ is any corporate body incorporated under the laws in force and authorized to build and operate joint housing by approval from a competent authority and ‘Apartment Owner’ is any person or corporate body buying, leasing or possessing, subject to the terms and conditions set forth in the agreement as referred to in this Act, an apartment in any other manner. It also says that ‘Committee’ means a housing management committee formed pursuant to section 24 to look after, manage and operate of a joint housing.

Chapter 5, section 16, mentions that an apartment owner has right over collective areas and facilities such as land of joint housing, the structure of the building with its services (sewerage, fire escapes, way in and way out), amenities (basement, solar, courtyard, garden, parking lots and go-down), generator post and guard post, facilities like electricity, gas, parts arranging, making of cold and hot water and parts of the building used for heating and air conditioning. An owner is also subjected to the rights to items of collective use such as elevators, pump, tanks, motor, fan and garbage container. As

per section 17, no division of these collective areas and facilities are allowed. While Section 18 states that an apartment owner shall pay the promotor or committee for maintenance, cleaning and upkeep of Collective areas and facilities, Section 19 denies the right to refuse to pay for them. In case of non-payment issue, Section 20 gives the right to the promotor or committee to withhold the use of any collective area and facilities and also prevent transfer of such apartment to any other person in any manner.

In case of the complete destruction of joint housing in any manner, Section 22 subsection 1 states that the land area of the housing will be divided among all the apartment owners proportionately.

Chapter 6 Section 23 states that protection, repairs and maintenance of the building and collective area and facilities is the duty of the promotor. In case the promotor is to sell all his apartments owned or is unable to perform his duties, Section 24 mentions that the duties under promotor is to fall under a committee formed among the apartment owners with everyone's consent. The promotor is liable to raise charges and fees for his duty as fixed in agreement according to Section 25.

Competent authority can issue directives to promotor or the committee which must be complied with according to Chapter 7, section 33. The government of Nepal may make rules for carrying out the objectives of this Act as stated in Section 35.

The Act does not cover any provisions for housing colonies where the owner buys a particular piece of land and an individual house. The definition of "joint housing" under the Ownership of Joint Housing Act only mention about the apartments and the rights and duties of an apartment owner, its promotor and the committee formed by a unanimous decision of the owners. An apartment complex is a building or a cluster of buildings with common collective spaces, and facilities. These spaces and facilities are shared by the apartment owners collectively and equally. The Act does not allow use of collective space for any private purpose. It does not allow the demarcation and prohibition of land. The apartment owners do not own parcels of land within the complex privately. They get a share of the land only in case of complete destruction of the apartment buildings. This is not the case for group housing colonies. In a housing colony, each house owner owns their parcel of land separately. There are roads

providing access to each land or house. These houses do not conform with the definition of joint housing or apartment explicitly mentioned in the act. There are minimum to no common spaces other than the road and some community spaces. So, the act does not particularly cater for gated housing colonies.

5.4. Building Byelaws, 2064 B.S. (2007 A.D.)

The Building Byelaws 2064 B.S. was brought into effect with the rapid urbanization, population growth, safety in construction and construction practices in mind. It is a document explaining and listing all the byelaws and regulations to be followed while planning, designing and constructing any infrastructure or building within the valley metropolis and neighbouring VDCs. It has provisions for the permit and construction process of a variety of building types and sizes.

Section 5 – Sub-section 5 (a) of the Building Byelaws addresses regulations for infrastructure planning and development of Apartment Housing, Group Housing and Residential Plot Development. This section has set the minimum area limit for government or private planned housing to 2 ropanies. It provides a provision that in areas having these planned developments, development of other infrastructures such as roads, water supply, telecommunication, electricity, etc. will be given priority by the concerned department.

Sub-section 5 (b) is concerned with the plans to be submitted (maps of surrounding lands, the proposed planned maps, maps of road, drainage, waste disposal system, water supply, etc. and blow out plan of each building) and the scale of the plans. The submitted plans are to specify the width of entrance, the roads and the area of the plots. The section further defines the minimum sizes of plots and open spaces. It provides for the land management, ownership and consolidation before and during the permit process.

Section 5 – Sub-section 5 (c) specifies the criteria for development and construction of apartment housing. It iterates the setbacks, ground coverage, FAR among other requirements that developers and builders need to meet to be permitted to construct an apartment housing.

This Building Byelaws document lacks detailed criteria one has to follow to be permitted to construct a group housing development. It lacks provision for the ownership of land common land within the group housing boundary.

5.5. The Town Development Act, 2045 B.S. (1998 A.D.)

The Town Development Act was formulated on 2045.08.01. The act was passed in the context of growing population and urbanization to provide necessary provisions for required services and facilities to the residents of the town. The act made provisions for reconstruction, expansion and development of existing towns and also the construction of new towns to maintain health, convenience and economic interest of the general public.

It defines "Town Planning" as plans formulated by the "committee" to carry out physical development, reconstruction or expansion of towns. It can also determine land use area for physical development to provide facilities such as road, transport, electricity, drainage etc and approved by the Government of Nepal. Town Development Committee is the committee formed by the Government of Nepal in any rural, town or regional development area to formulate plans for the town development. "Local body" means VDC or Municipality and also includes Metropolitan or Sub- Metropolitan city. "Local Plan" means a plan prepared by local body upon setting programs for the development of its area.

Section 3 and 4 of the act provides for the details of town planning, local plans and the committee. Section 8 and 9 provides for the power of committee to impose restrictions, regulate, control and prohibit certain activities within the planning area that may affect the plan or the outlook, over view and integrity of the development.

Section 10 gives the committee the power to prevent or demolish acts or construction performed by a person that violates the conditions and guidelines of the plan through proper notice, prescription and order. Section 11 iterates the functions, duties and powers of the committee, among which is the power to specify necessary conditions or standard in land use area for physical development. It has the power to prescribe necessary conditions on construction and other activities and to perform and cause to

perform the act as per said conditions. The third amendment added section 12 A mandates any institution that intends to operate physical development in the area where town planning has come into effect to take approval from the committee. Upon approval, the institution is allowed to operate as per the terms set by the committee.

This act mainly provides for and caters to the planning and development of towns and other development areas performed by a government body. It however has provisions and restrictions for private institutions wishing to perform development activities in the planning area. This facilitates an opportunity for the government body to implement regulations to ensure the development caters to and facilitates the town and community as a whole and is not completely secluded for the use and benefit to private parties.

5.6. The Right to Housing Act, 2075 B.S. (2018 A.D.)

The Right to Housing Act was formulated on 2076.06.02. The act was made to provide for the right to housing of every citizen of the country. It was passed to make necessary provisions on providing the homeless citizens with appropriate and safe housing facility in accordance with the Constitution of Nepal.

Chapter 1, Section 2 defines “Housing” as a building, house, part of it or such permanent or temporary, partial or full structure constructed for the residential purpose. It defines “Place of housing” as the housing and the four corners occupied by it, and this term also includes the place having joint or group housing. According to the act "Housing site" means the group of one or more places of housing and ‘Local Level’ means rural municipality or municipality.

Under chapter 2, the policy states that every citizen shall have the right to make a safe, appropriate and suitable housing and such right shall be respected, protected and fulfilled to this Act and other prevailing laws.

The Act relates to citizen’s rights and duties related to housing. It lacks provisions related to gated community and group housing. It does not specify the rights, restrictions and responsibilities of residents or owners of plots within the group housing to the common areas.

5.7. Land Use Policy 2015 A.D.

The Land Use Policy was introduced for protection, promotion and optimum use and effective management of Land and Land Resources (LLRs). Land Use Policy 2013's main agenda was protection of arable land to ensure food security. The earthquake of 2015 brought into light the need to focus on secured settlement as well and disaster risk mitigation to escape the vulnerability from such devastating disaster. So the policy was reviewed and Land Use Policy 2015 was formulated.

Land Use Policy 2015, aims for social, economic and ecological development by optimum use of available Land and Land Resources (LLR) thus leading the country towards prosperity. The objective of Land Use Policy 2015 is to categorize lands into specific land use zones thus making it easy for protection of agricultural land, forest land and develop better sustainable settlement all the while reducing the risk of disastrous hazards.

Policy 2 of LUP 2015 states that level-wise Land Use Plans shall be devised of and be executed according to the federal structure. With expertise on hand, new technology and technical assistance, Federal Land Use Map is to be prepared, based on national priority and policy, following the objectives of the Land Use Plan. The plan thus formulated at federal level provides a better basis upon which Land use plans at local levels can be further detailed with modified application, additional rules and regulation concurring with the Federal Level Land Use Plan.

Land Use plan at local level is to involve local communities and should be devoid of discrimination in any form.

According to Policy 4, Level wise LUP compatible with physical Infrastructure and development projects shall be devised of and implemented. On the basis of Land Use Plan, a proper well organized and planned human settlement is to be proposed in places that are geologically sound (i.e. low risk due to land nature). Proper planning of infrastructure is advised for better distribution of facilities and uplift quality of life to form a resilient community towards any form of risks.

For the operation of physical infrastructure development work, industrial development as well as land development programs private and cooperative sectors is to be encouraged.

These policies provide for the power and responsibility to all levels of government from local to central or federal bodies to formulate a land use plan suitable for their area and enforce the same. This gives local bodies a new and unique opportunity to perform proper urban development plans, specify the usage of land and responsibilities that a private or government body have to fulfil and abide by while performing planning, construction and development.

5.8. National Urban Development Strategy 2017 A.D.

MoUD has formulated National Urban Development Strategy (NUDS) to lead the process of urbanization by integrating actions of important urban sectors through strategies that will help shape the future of the urban areas. With the vision for next 15 years, NUDS has envisaged integrated urban development efforts. NUDS has been shaped realizing the need of strategic direction that will guide the urban development process in the country.

Under safety and resilience of NUDS, a strategy targeting physically, socially, economically, environmentally and culturally safe and resilient urban areas has been cited. Risk sensitive resource mapping is prepared identifying high risk areas in all urban areas based on available information, and existing building regulations. Also rapid hazard appraisal technique is developed to identify hazards and prepare multi-hazard map of all urban areas and incorporate disaster risk management component in urban development plans, generate information on climate change in urban areas of different ecological regions. Formulate National Adaptation Plan (NAP) on urban settlements and infrastructure

Another strategy to establish system of periodic review to strengthen building code, building regulations and guidelines and planning by-laws on the basis of lessons learnt with mechanisms to enforce and monitor them in all urban areas is provided. Building code/regulations/guidelines and planning byelaws is reviewed periodically which

increase technical capacity of the local bodies to enforce building code/regulations/guidelines and planning by-laws. The preparation simplified building guidelines and planning byelaws that can be understood at grass root level. Also facilitating mandatory enforcement and periodic monitoring of land use regulation, building code/regulations/guidelines and planning bylaws in all urban areas.

This target to continually study urban patterns, assess risk and hazards, evaluate issues and shortcomings in the plans and policies give opportunity to notice and learn from the drawbacks and obstacles in safety, security, convenience and development. The commitment to review and revise building code/regulations/guidelines and planning byelaws periodically then provides room and opportunity to improve said regulations and guidelines to help local bodies understand and enforce the codes and byelaws.

6. STUDY AREA

A study area is the place where research was conducted. Study area is selected per the characters of the gated community and its locality. Here a study area with a few gated communities and a growing population and density is required to study the impacts of gated communities and increasing density on mobility and accessibility. An area with a sizeable gated community with multiple access points is taken. The accessibility and mobility trends and ease of access are studied via observations at junctions or bottlenecks. Travel times are recorded and distances measured or possible route options. Then hypothetical scenarios shall be created to understand the implications of gated communities in mobility and ease of access. These data shall be analysed, and shall help determine how mobility and ease of access can be increased.

The study area taken for the purpose of this research is, Sainbu, Khokana and Bungamati area. The area is made up of wards 18, 21, 22 and 25 of the Lalitpur Metropolitan City.

6.1. Study Area Overview

Sainbu, Khokana and Bungamati area covers a total area of 11.18 Sq.Km. Bhaisipati is growing as a posh, luxurious residential settlement. It is a part of Lalitpur Metropolitan city. It lies in the southern outskirts of the city outside the ring road. With such development comes land use change, demand for infrastructure, rise in the number of people using facilities and services. Various communities (gated or otherwise) is emerging in this location. Some gated communities reflect the growing range of choices available to consumers in the postmodern city. The affluent can move to gated enclaves in search of privacy and exclusivity, and in flight from fear, closing themselves off from the dangers outside. (Dillion, 1994)

It being in the outskirts of the city many people residing there have jobs in the city and commute to and from the city every day. There are 3 routes from the study area to the city or CBD. These are shown in Figure 35. Here, "Route 1" acts as the primary access way for the entire area, i.e. Sainbu, Khokana, Bungamati area. This route runs through the spine of the settlement and connects Bhaisipati, Nakkhu, Bungamati and Khokana

to Ekantakuna junction at ring road. This is a mostly wide (20 m) road that narrows at certain places near Nakkhu junction and beyond Bhaisipati. “Route 2” branches out from the spine and goes through some residential areas in Sainbu (Nakhudole area) across the Nakkhu River through Kusunti area and connects to Mahalaxmasthan junction at ring road. This route is mostly narrow (4-6 m) and is mostly gravelled and not black topped. This route is long and tedious to access the central or western parts of the city. Thus, this route does not see much traffic going to and from the city. “Route 3” is an access road that would go through Vinayak Colony area had it not been restricted and closed off to the general public. This access way connects the lower parts of Khokana along with Magargaun through Bhaisipati Awas to the main Spinal road. This route can circle back to Nakkhu junction or go across Bagmati river towards Balkhu junction or Sanepa- Dhobighat area through Chobhar. The road is mostly black topped and wide (8-20m). However, since it is closed off at the gated colony, to go towards Chobhar and Kirtipur, one has to go through “Route 1” and access that route via Nakkhu junction. Although there are these 3 routes (Figure 35) most of Sainbu, Khokana and Bungamati area has only one primary access to and from the city, i.e. via. Nakkhu road (Route 1). Thus, traffic count of Route 1 (Figure 35) is conducted for the study purpose.

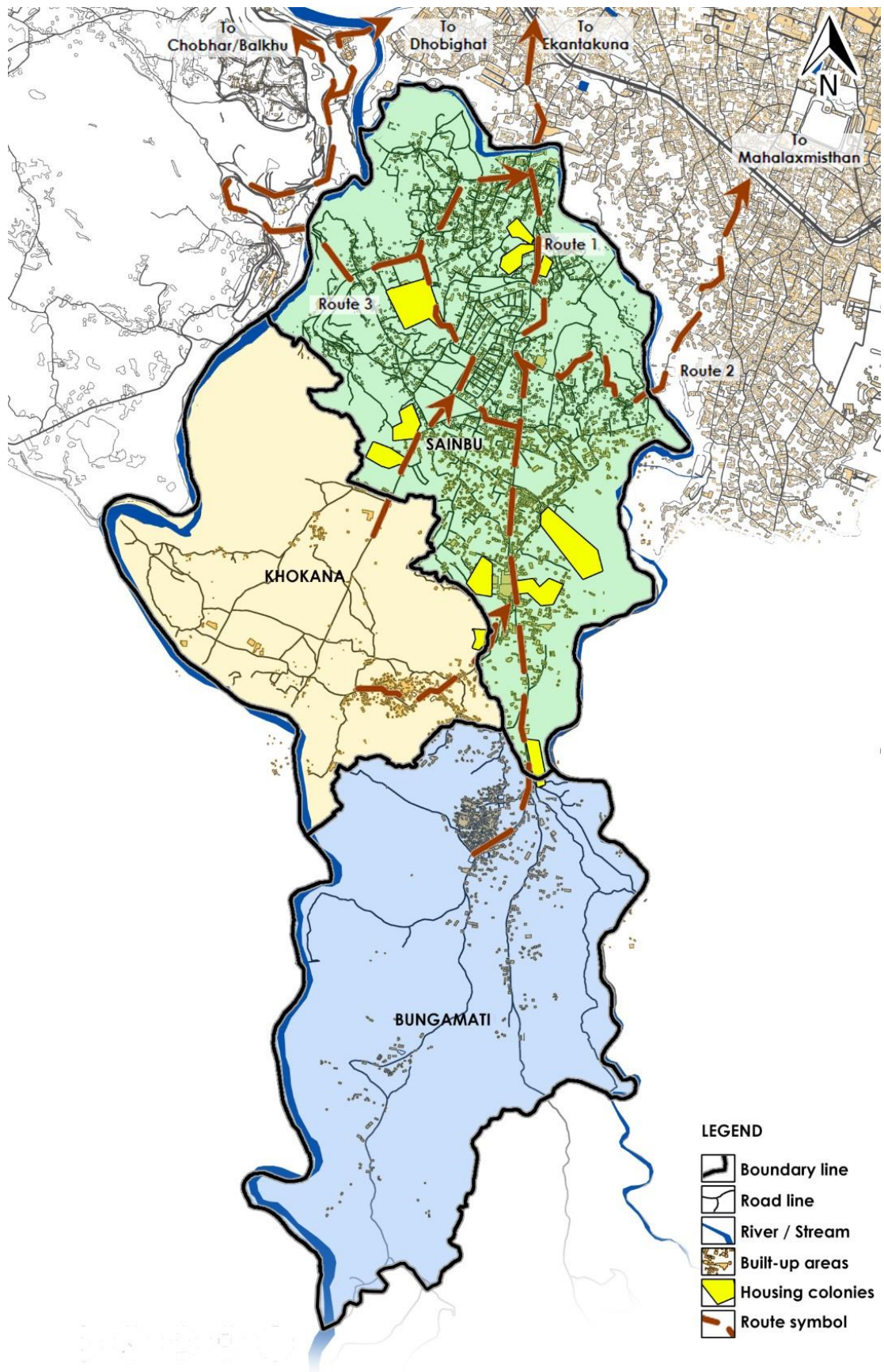


Figure 35 Study Area with Housing Communities and Routes to the City

6.2. Growth and Development of Study Area

Sainbu, Khokana and Bungamati areas were sparsely populated in 2001 A.D. with a population of 13,683 and 2,459 numbers of household. (CBS, 2001) Little scattered settlements were seen in Sainbu and Nakkhu area. Bhaisipati was very sparsely populated and there were limited houses along the spinal of Ekantakuna – Tikabhairab road. Khokana and Bungamati only had settlement in the core area. These are the traditional satellite towns of Patan. Up until 2001 A.D., there were no housing colonies in Bhaisipati. The settlement was sparse and of very low density as shown in (Figure 36). However, in 2001, “Civil Homes took the first big leap by building 55 houses in Bhaisipati. The response was so overwhelming that all houses were booked even before they were finished.” (Newar, 2004)

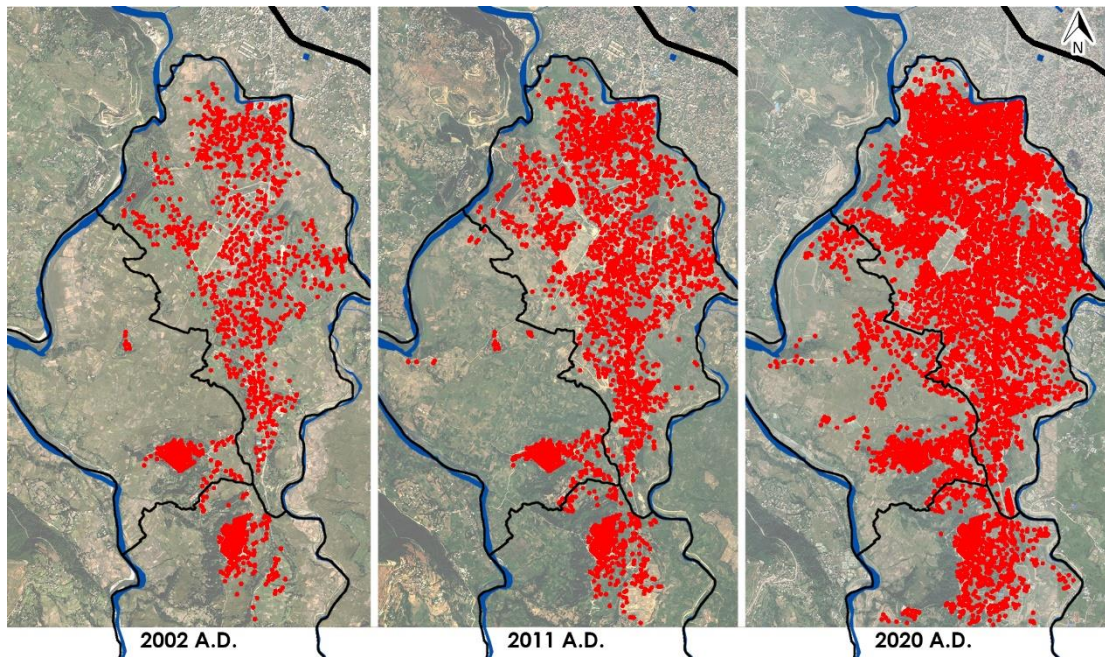


Figure 36 Satellite History Image of Growth of Study

By 2011 A.D., the population of the Sainbu, Khokana and Bungamati area had increased significantly by almost 3 fold. The total population of the area in 2011 A.D. was 30,614 and the total number of household was 7,363. (CBS, 2011) The settlement density was increasing in Sainbu and Nakkhu area. Bhaisipati was experiencing more infill development and the settlement started spreading away from the spinal road. Settlement around Bungamati and Khokana had seen a slight increase with souses

coming up along the roads leading up to the traditional town. Along with Civil homes, Vinayak Colony (phase 1) and Reliable Colony had come up in 2011 A.D. The Settlement had started to densify as seen on Figure 36. With the introduction of these housing colonies, the area started gaining popularity as a posh luxurious settlement.

Sainbu, Khokana and Bungamati area, currently in 2020 A.D, has seen a boom in development. Taking into consideration, current growth rate, the total population of the area is estimated to be around 68,000. Settlement of Sainbu and Nakkhu areas have become very dense. More housing colonies and communities have come up in Bhaisipati and along the spinal road connecting Ekantakuna – Tikabhairab. Government housing and projects have also been introduced or planned in the area. This has further increased the land value of the area. Real estate values have increased significantly in the local market. As Sainbu started densifying, the community and housing moved towards Khokana and Bungamati. As seen in Figure 36 Sainbu area has become very dense and the urbanization is moving further south. Settlements in Khokana and Bungamati have spread away from the core traditional towns and started forming clusters of buildings near the old towns.

Table 6 shows the household and population data from the National Population and Housing Census of 2001 and 2011 A.D.

National Population and Housing Census Data 2001 A.D.						
VDC	District	Total Household	Total Population	Avg. Household Size	Area (Sq. Km)	Density (PpHa)
Bungamati	Lalitpur	886	4,813	5.43	3.89	12.37
Khokana	Lalitpur	699	4,258	6.09	3.17	13.43
Sainbu	Lalitpur	874	4,612	5.28	4.12	11.19
Total		2,459	13,683	5.56	11.18	12.13

National Population and Housing Census Data 2011 A.D.						
VDC	District	Total Household	Total Population	Avg. Household Size	Area (Sq. Km)	Density (PpHa)
Bungamati	Lalitpur	1,304	5,966	4.58	3.89	15.33
Khokana	Lalitpur	1,056	4,927	4.67	3.17	15.54
Sainbu	Lalitpur	5,003	19,721	3.94	4.12	47.87
Total		7,363	30,614	4.15	11.18	27.38

Table 6 Household and Population Data of Study Area

6.3. Site Area

Site area for the data collection, survey and analysis in this research is selected as the Bhaisipati area in Sainbu. We can see that the density of this area is relatively high and growing. The number of housing and gated colonies are growing as gating and living in a plotted land development have garnered an increased interest in the locals.

Bhaisipati Area

Bhaisipati area is located towards the west of LMC. It falls within ward 18 and 25, previously Sainbu VDC of the Lalitpur District. It is bordered with the Bagmati river to the west and Nakkhu river to the north and east directions. The settlements of Khokana, Karyabinayak and Bungamati lie towards the south and is accessed through the Ekantakuna – Tikabhairab road that runs along the spine of the area.

Bhaisipati area houses various housing colonies among which is Vinayak Colony. It is a closed gated community with access on 2 different roads, thus having a possible thorough fare access. It also restricts public access to a road that could have been a thorough fare road. It is a large cluster of houses with privatized land. The colony is a fenced and gated community that also houses amenities including a departmental store and swimming pool. These amenities and facilities are restricted to use for the residents of the community only. This gated cluster of houses has access to Bhaisipati Awas to the south and the road connecting the Nakkhu road to Chobhar towards the north. The residents of the community have direct access to either Bhaisipati Awas to the south or the road connecting Nakkhu road to Chobhar towards the north. However, this access route is blocked off to the general public who may not be a resident of the gated community. The gates are closed to all non-residents of the community and access to any infrastructure or amenities is restricted or blocked altogether. Thus, the roads inside this community is not accessible to the public. They don't allow thoroughfare from Bhaisipati Awas to the road in the north through the community roads to the public. This can cause various impacts on the mobility of the locality.

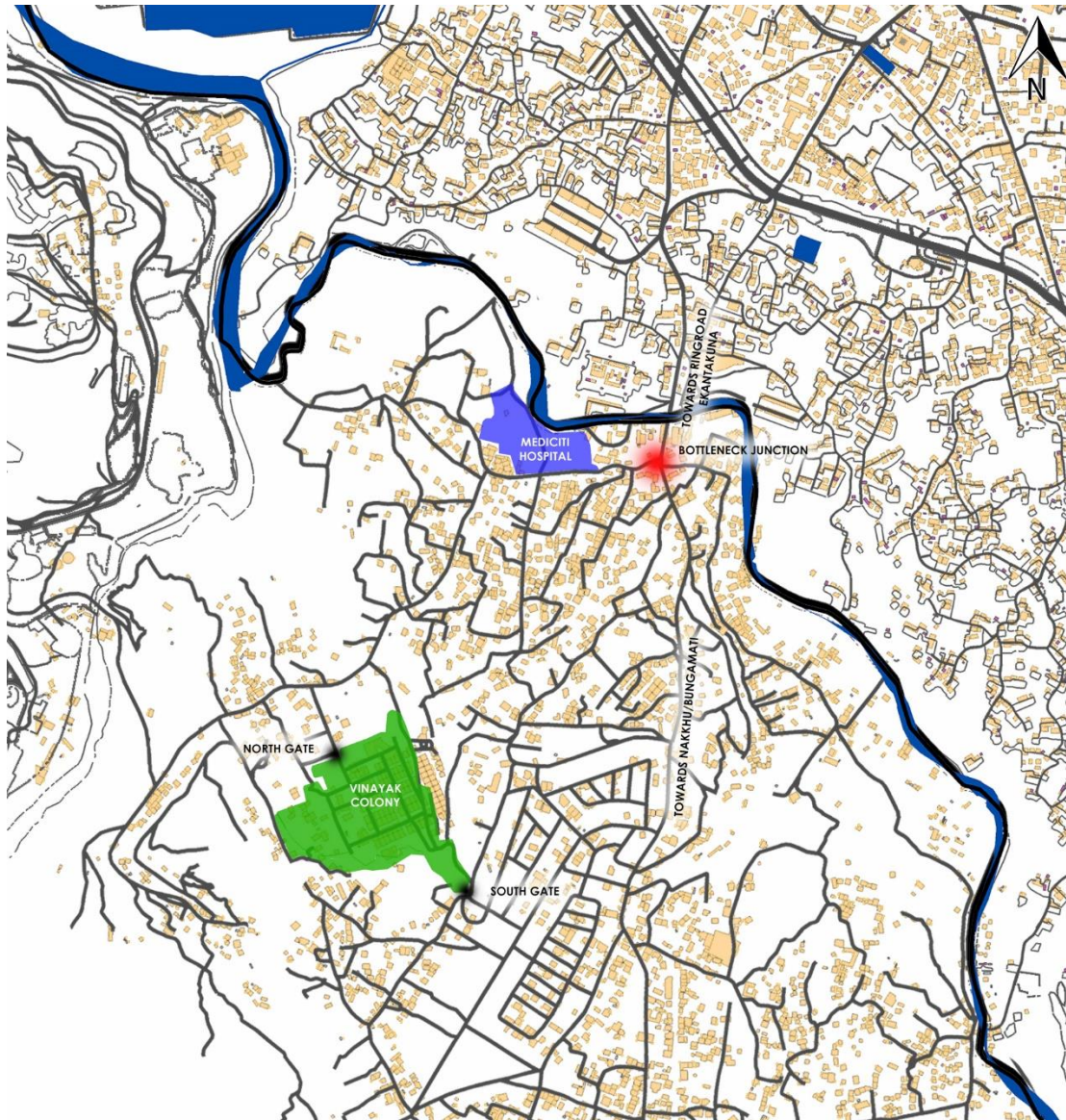


Figure 37 Sainbu-Bhaisipati Area

During the rush hour, a bottle neck is created at the junction where the Nakkhu-Chobhar road meets Nakkhu- Bhaisipati road. This bottleneck junction is both narrow and sees a large volume of traffic. Most of the traffic originating from all the places within Bungamati, Khokana, and Sainbu area pass through this junction to access the CBD and the city. The region is developing, and with development population, settlement and traffic density will increase. The research is to study if allowing adequate thoroughfare between Bhaisipati Awas and Nakkhu-Chobhar road will help ease congestion and aid in mobility and easy accessibility.

7. FIELD OBSERVATIONS, DATA AND ANALYSIS

7.1. Description of Site Area

The junction where Ekantakuna - Tikabhairab road and Nakkhu-Chobhar road meet is quite narrow. This paired with the fact that it is the only route used by most vehicles to access the city from the entire Bungamati, Khokana and Sainbu area, causes a lot of congestion during rush hour.

In Figure 39, Point 'A' is the Ekantakuna junction at ring road. Point 'B' is the entrance of Bhaisipati Awas to the south of Vinayak Colony. Point C is the bottle neck at Nakkhu junction. Traffic count is taken of this junction of number of vehicles going in different direction. Point 'D' is the Magargaun junction.

The distance between A and B is 1.8 Kms. This stretch of road, i.e. A-B is the most frequently used as most people living in Bhaisipati, Sainbu, or even Bungamati have to commute via this road to access the city.

Rush hour time sees a lot of traffic jam at Nakkhu junction. Thus, time taken to travel from point A to B n vice versa was recorded during rush hour on week days and an average was taken. The time taken to travel the same distance on weekends or holidays was also taken to gauge the difference in travel times.

As the junction sees a lot of congestion average stopping time and the average number of times a vehicle has to stop to cross the junction while travelling from A to B or vice versa was recorded and average time lost is calculated.

Then as a hypothesis, the time taken to travel from point B to Point A via Vinayak Colony, assuming there is little to no congestion in Nakkhu junction due to the free left rule in the traffic laws, based on the distance and base average speed is calculated.

After all this data and assumptions are compiled, interpreted and based on the policy review and the interpretations, discussions and possible solutions or measures to be taken is suggested.

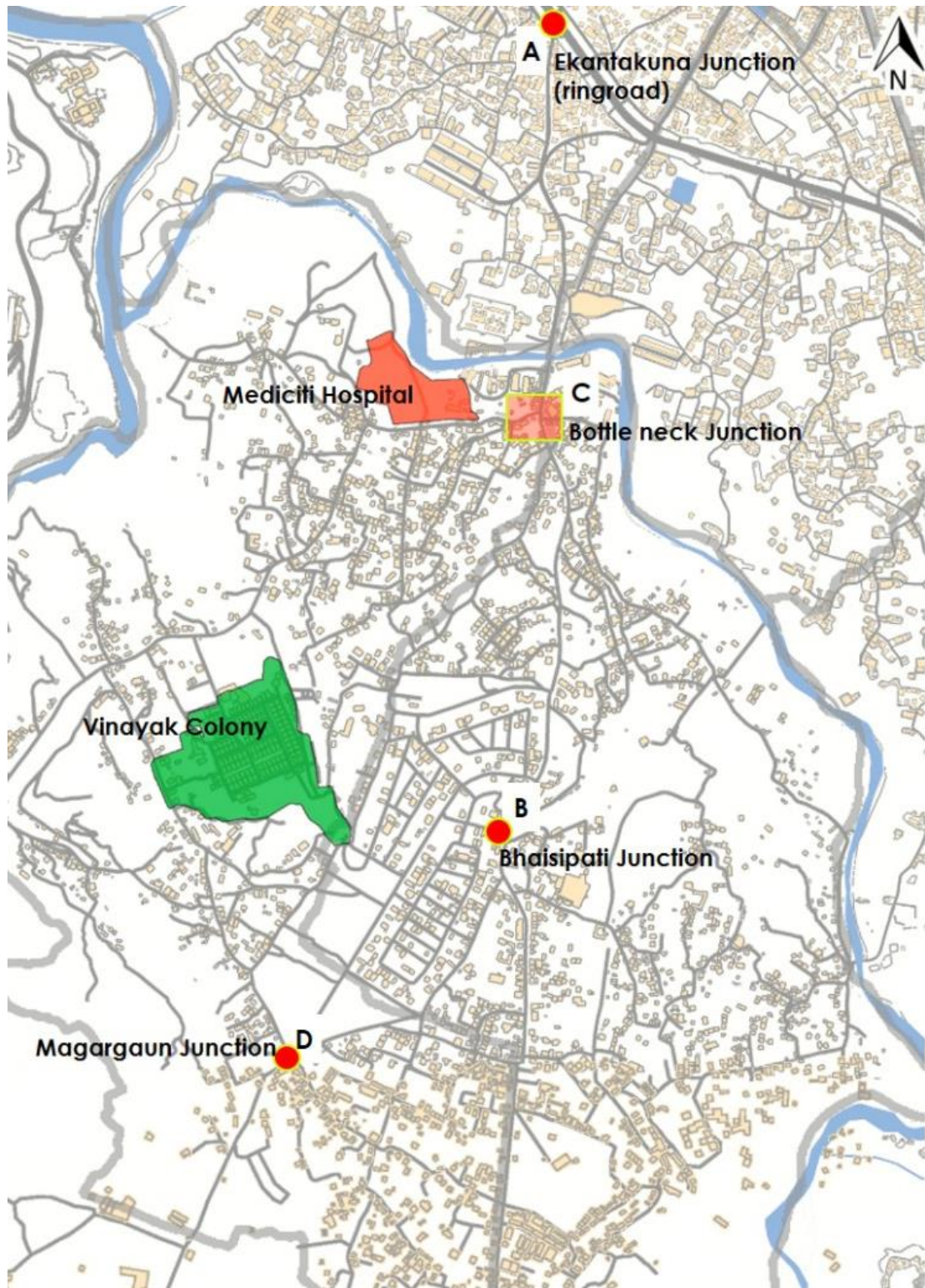


Figure 39 Description of Site Area

7.2. Data Collection

A video of the junction Bottle neck Nakkhu junction (Figure 41) is taken with maximum possible angle of coverage for the stipulated time of 1 hour during the morning and evening rush hour. The video is then later reviewed to count number and types of vehicles going in any particular direction.

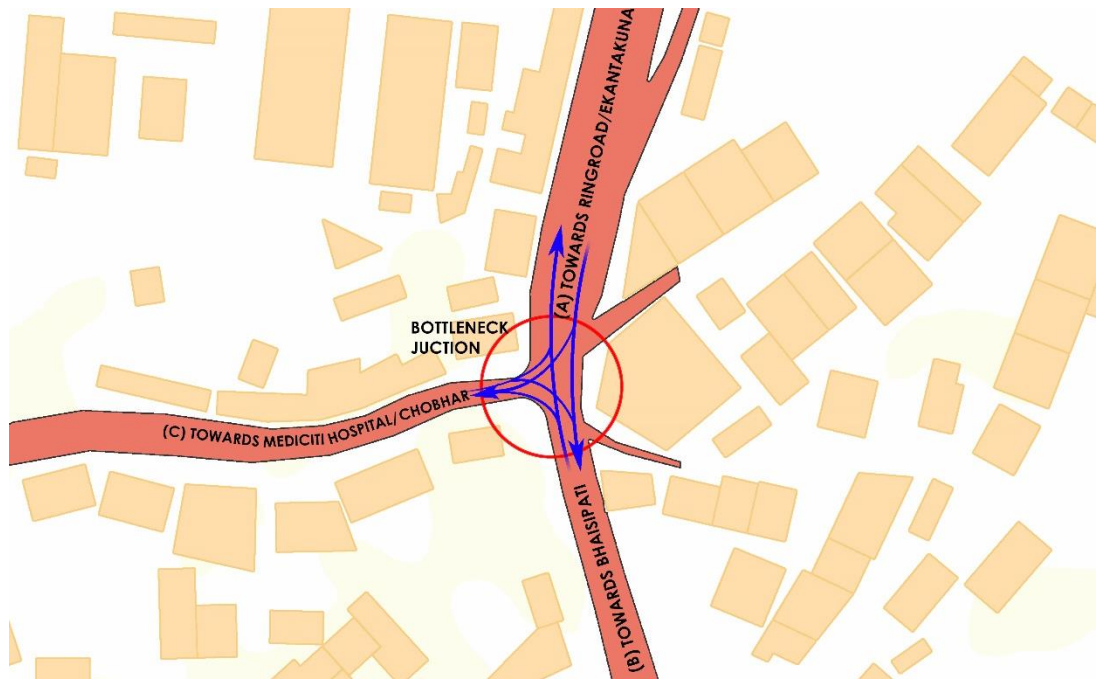


Figure 40 Bottleneck Nakkhu Junction



Figure 41 Junction View for Recording Video

Figure 40 of the Nakkhu junction shows that the junction has 3 main roads connecting to it. From 'A' Ekantakuna, from 'B' Bhaisipati and from 'C' Mediciti / Chobhar. Here there is a lot of cross flowing traffic as vehicles move from all three sides to all three sides. This makes traffic management a compulsion. Number of vehicles travelling from A to B, A to C, B to A, B to C, C to A and C to B is recorded and calculated.

7.3. Traffic Count and Pattern

Traffic count is carried out at the bottle neck junctions. The traffic is divided to 4 categories namely:

Two Wheelers: This includes motorbikes, scooters, mopeds, and bicycles.

Light Vehicles: This includes all light three wheelers and four wheelers. These are small cars, hatchbacks, sedans, crossovers, SUVs, jeeps, delivery vans, micro bus or vans, tempo and pickup trucks.

Heavy Vehicles: This includes all heavy vehicles including busses, trucks, mini busses, mini trucks, tippers and any other heavy machinery vehicles.

Other Vehicles: This includes all light slow vehicles that might affect traffic flow significantly, like 3 wheeler rickshaw, a tractor, a tractor trailer, a motor rickshaw, etc.

The Metropolitan Traffic Division has allocated the time between 9-11 am in the morning and 4-6 pm in the evening as rush hour. Thus, traffic count is done for one hour between 9:30-10:30 am in the morning and 4:30-5:30 pm in the evening at bottle neck junction to determine the volume and flow of traffic.

Time taken to commute from a fixed point to and from ring road is also taken during peak rush hour and on a holiday to compare the time spent. Average wait time and the number of times one has to stop is also taken during the peak rush hours. This helps determine traffic patterns, mobility trends, ease of access and commute time and distance.

Two wheelers, small vehicles (3 or 4 wheelers) and heavy vehicles are counted. Other miscellaneous vehicles such as tractors or rickshaws are included as well.

The data so collected is presented in a tabular form as shown in Table 7.

NAKKHU JUNCTION

READING TIME TAKEN 9:30AM 10:30AM

DIRECTION							
TYPE OF VEHICLE	No. of Vehicles (A-B)	No. of Vehicles (A-C)	No. of Vehicles (B-A)	No. of Vehicles (B-C)	No. of Vehicles (C-A)	No. of Vehicles (C-B)	TOTAL
DAY 1 (2020.01.30)							
2 WHEELER	761	376	1166	30	512	40	2885
SMALL 3-4 WHEELER	275	173	368	11	230	8	1065
HEAVY VEHICLES	52	13	52	1	9	2	129
MISC	1	4	3	1	2	1	12
TOTAL	1089	566	1589	43	753	51	4091
DAY 2(2020.01.31)							
2 WHEELER	824	388	1330	35	531	46	3154
SMALL 3-4 WHEELER	293	203	398	9	233	9	1145
HEAVY VEHICLES	43	12	32	3	12	3	105
MISC	1	1	2	1	3	1	9
TOTAL	1161	604	1762	48	779	59	4413
DAY 3(2020.02.04)							
2 WHEELER	805	354	1258	46	621	55	3139
SMALL 3-4 WHEELER	304	193	456	19	283	6	1261
HEAVY VEHICLES	39	16	43	1	12	3	114
MISC	1	0	3	1	2	1	8
TOTAL	1149	563	1760	67	918	65	4522

Table 7 Traffic Count at Bottle neck Junction (Morning)

Table 7 shows the morning traffic count of Nakkhu junction taken during rush hour. On an average 4,342 vehicles pass this junction in one hour of morning rush hour. The number of vehicles travelling on an average is from A to B and vice versa with 1,113 and 1,704 respectively. An average of 577 and 817 vehicles travel from A to C and C to A respectively. While the lowest number of vehicles about 50-60 travel between points B and C. Similarly, the average number of vehicle according to type are 3059

two wheelers, 1157 three to four wheeler small vehicles and 116 heavy vehicles while other miscellaneous vehicles are about 10 in number per day.

NAKKHU JUNCTION

READING TIME TAKEN 4:30PM - 5:30PM

DIRECTION							
TYPE OF VEHICLE	No. of Vehicles (A-B)	No. of Vehicles (A-C)	No. of Vehicles (B-A)	No. of Vehicles (B-C)	No. of Vehicles (C-A)	No. of Vehicles (C-B)	TOTAL
DAY 1 (2020.01.30)							
2 WHEELER	1156	496	812	59	412	42	2977
SMALL 3-4 WHEELER	312	195	295	12	214	9	1037
HEAVY VEHICLES	48	12	52	2	15	2	131
MISC	1	2	1	1	1	2	8
Total	1517	705	1160	74	642	55	4153
DAY 2(2020.02.31)							
2 WHEELER	1235	405	886	41	468	39	3074
SMALL 3-4 WHEELER	303	221	365	8	203	11	1111
HEAVY VEHICLES	42	15	35	2	12	5	111
MISC	1	1	3	1	2	1	9
Total	1581	642	1289	52	685	56	4305
DAY 3(2020.02.04)							
2 WHEELER	1208	569	977	48	349	39	3190
SMALL 3-4 WHEELER	325	301	422	12	206	9	1275
HEAVY VEHICLES	43	15	73	5	11	6	153
MISC	1	1	1	1	0	0	4
Total	1577	886	1473	66	566	54	4622

Table 8 Traffic Count at Bottle neck Junction (Evening)

Table 8 shows the evening traffic count of Nakkhu junction. On an average 4,360 vehicles pass this junction in one hour of evening rush hour. More than half of that i.e. about 2,866 are travelling between points A and B. The next main commute route is between A and C where about 1,375 vehicles commute. The lowest number of vehicles about 120 travel between points B and C. Similarly, the average number of vehicle according to type are 3059 two wheelers, 1157 three to four wheeler small vehicles and 116 heavy vehicles while other miscellaneous vehicles are about 10 in number per day.

The Road towards Ekantakuna ('A' in Figure 40):



Figure 42 Road Towards Eantakuna Junction from Bottle neck Junction

Road Towards Ekantakuna is wide and open. It has a surface drain and footpath on either sides.

This road sees parking and fruit vendors on either sides. This is also where all the public vehicles stop to pick up or drop off passengers. The road is mostly black topped except right as it reaches the junction.

The Road towards Bhaisipati ('B' in Figure 40):

The road towards Bhaisipati slopes up as it leaves the junction, the road is 6 mts wide at the junction. The black top also has pot holes and the drive isn't pleasant. The road gets better as we approach the Bhaisipati Awas gate.

The road is mostly narrow without footpath on either side till the Bhaisipati Awas entrance. One side of the road has a large drain covered with concrete slabs. This road sees the most traffic and the wait time is also longer here.



Figure 43 Road Towards Bhaisipati From Bottle neck Junction

The Road towards Mediciti/Chobhar ('C' in Figure 40):

The road slopes up as it leaves the junction the road is properly black topped with minimal surface drain on either side. At the very junction the road meets a degrading black top layer.

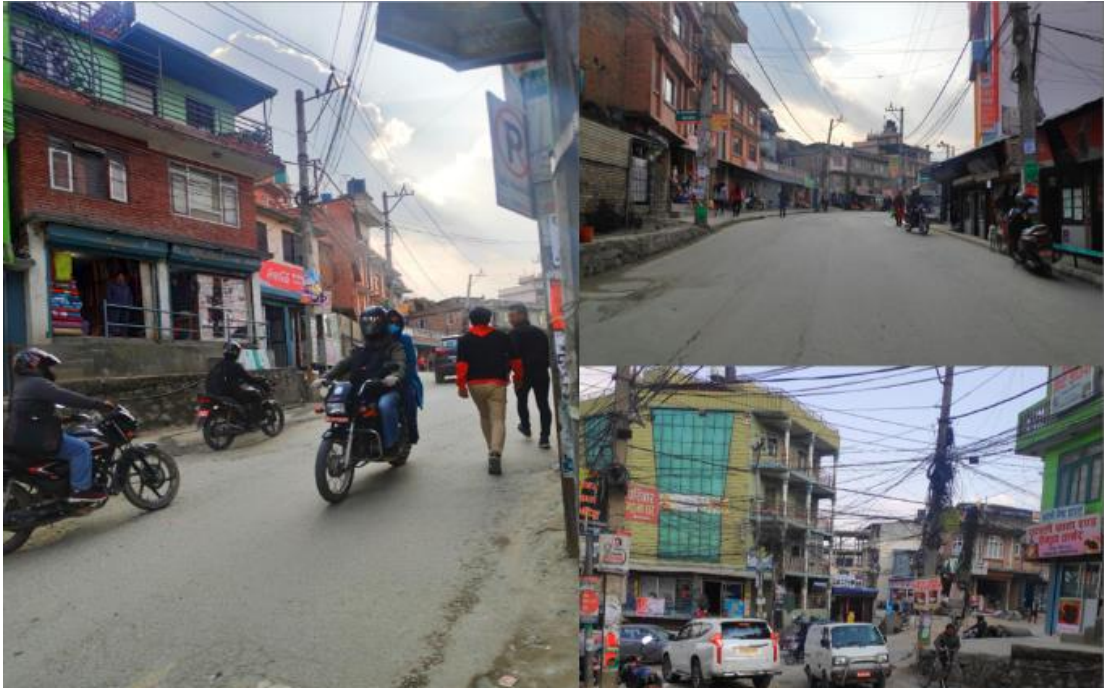


Figure 44 Road Towards Mediciti/Chobhar from Bottle neck Junction

The road is 6m wide where it meets the junction and as it moves towards Mediciti, it becomes 8 m wide. It has a footpath on one side and minimal surface drains on either side.

7.4. Travel Time Data

Time taken for a vehicle to travel between points A and D, A and D via Ekantakuna – Tikabhairab road i.e. Route 1 (Figure 45) is recorded. These recordings are taken in different times of the day on different days. This includes normal work day during the rush hour traffic time when there is a lot of vehicles, normal work day in the time when there is no rush hour traffic and on a holiday when there is minimum traffic. This helps in the understanding of extent of delay which directly correlates to the accessibility and mobility in the area. The average time taken on various scenarios is calculated and tabulated in Table 9.

S.N.	Working day (Rush hour Traffic)	Working day [Normal Traffic]	Holiday [Minimum Traffic]
TIME TAKEN FROM A-B			
1	6:41	5:12	3:46
2	6:48	4:53	3:41
3	6:51	5:03	3:39
AVERAGE	6:46	5:02	3:42
TIME TAKEN FROM B-A			
1	11:23	5:26	3:33
2	12:59	6:04	3:39
3	14:32	5:48	3:32
AVERAGE	12:58	5:46	3:34
TIME TAKEN FROM A-D			
1	8:45	6:35	5:22
2	8:50	6:42	5:25
3	9:04	6:29	5:19
AVERAGE	8:53	6:35	5:22
TIME TAKEN FROM D-A			
1	16:55	7:56	5:26
2	16:48	8:12	5:29
3	17:09	8:18	5:22
AVERAGE	16:57	8:07	5:25

Table 9 Travel Times Between A - B and A - D

From Table 9, the following observations can be made. During holidays on an average it takes 3:42 minutes to travel the distance of 1.8 Kms via 'Route 1' (Figure 45) from point A to B and 3:34 from point B to A. This indicates that an average speed of around 30 Km/h is achieved. On working days during non-rush hour times, when there is moderate traffic, the travel time for moving from A to B increases to about 5:02 and from B to A increases to 5:46. On working days during rush hour time, with maximum vehicles, the travel time is significantly increased when moving from B to A as a vehicle typically has to stop for 2.67 times for an average total of 3:27 minutes. Thus, the travel time from B to A is 12:58. This indicates an average speed of 8 Km/h. The travel time for moving from A to B is 6:46. This is probably because it does not require stopping at the junction.

As for time taken to drive 2.7 kms via route 1, (Figure 45) from A to D and D to A are 5:22 and 5:25 respectively. This also indicates an average speed of around 30 Kmph. On working days during non-rush hour times, when there is moderate traffic, the travel time for moving from A to D increases to about 6:35 and from D to A increases to 8:07. On working days during rush hour time, the traffic volume is very high and the travel time is significantly increased when moving from D to A as a vehicle typically has to stop for about 3.33 times for an average total of 3:32 minutes. Thus, the travel time from D to A is 16:57. This indicates an average speed of 9.5 Kmph. The travel time for moving from A to B is 8:07 This is probably because it does not require stopping at the junction.

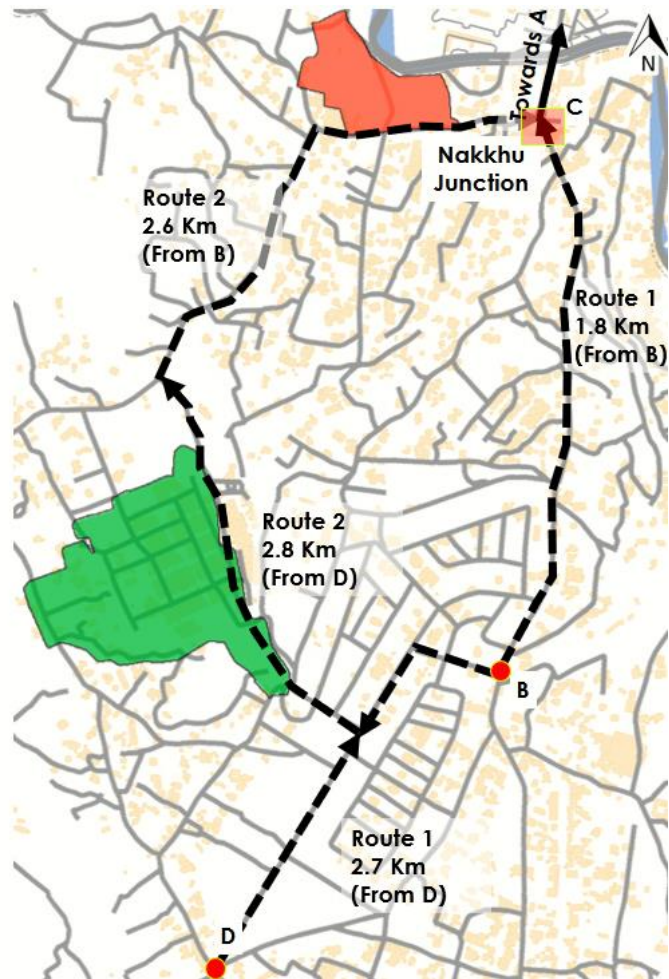


Figure 45 Route Options to Point A

7.5. Road Sections

The road width and road sections vary significantly along the two routes, route 1 and 2. The road width starts at 13m at Bhaishapati junction and reduces to 8m while moving towards Nakkhu junction and finally reduces to 6m when it reaches the junction. In route 2, the road section between point A and point B is 10 m wide. Then it reduces to 6 m while moving through Vinayak colony. The Chobhar-Nakkhu road is 8-9m wide until it reaches Nakkhu junction where it narrows down to 6m.(Figure 46) The road width varies significantly thus the traffic is more congested and chaotic than it needs to

be. Moreover, the road is narrower at the main junction this causes for even more congestion.

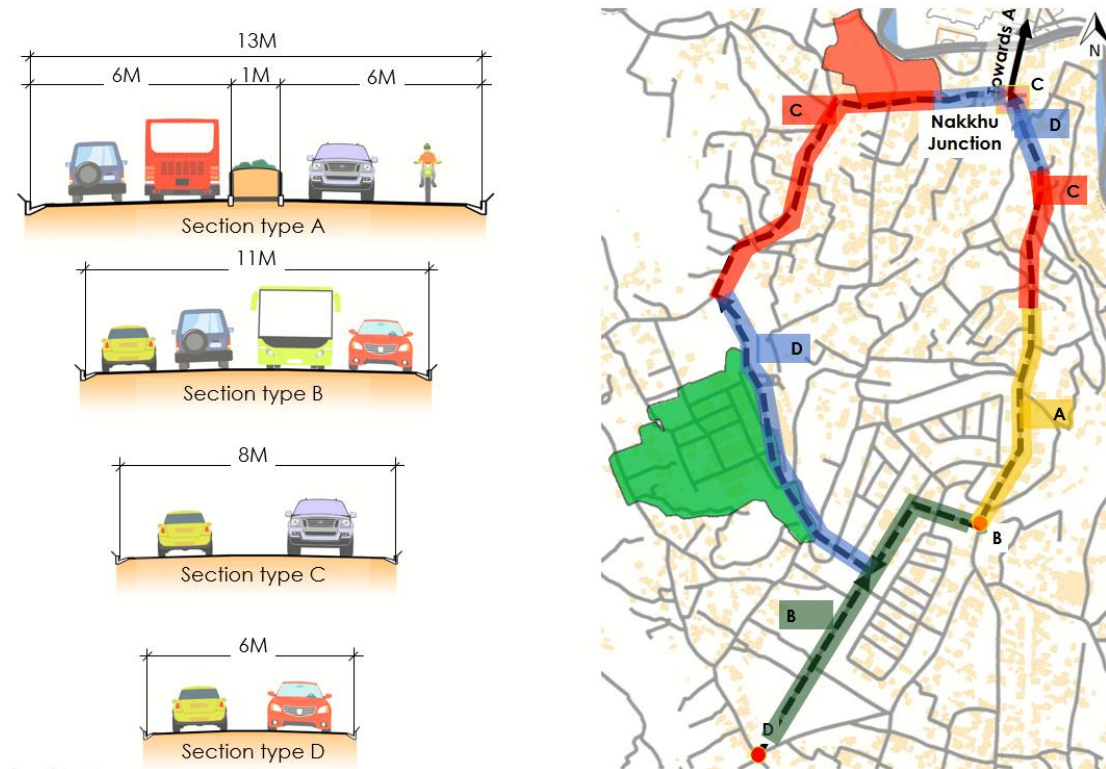


Figure 46 Road Sections Along Route 1 and 2

In this type of scenario, all roads need not necessarily be widened. The volume and flow of traffic might demand a certain width of road any excess may be used for other purposes like greenery, parking, wider footpaths etc. However, a well-designed roadway is necessary. The variation of road width seen here causes traffic to be chaotic and difficult to manage both for the traffic management personnel and the driver or user of the road. Lanes merging in and out in such a short distance causes confusion and distorted traffic volume along the road. The speed also keeps varying. This causes instability and aids in the unmanaged traffic conditions.

7.6. Traffic Data Analysis

Number of vehicles travelling from A to B, A to C, B to A, B to C, C to A and C to B recorded in Table 7 and Table 8 is further analysed with the help of charts. The data is represented in the chart as Figure 47 and Figure 48.

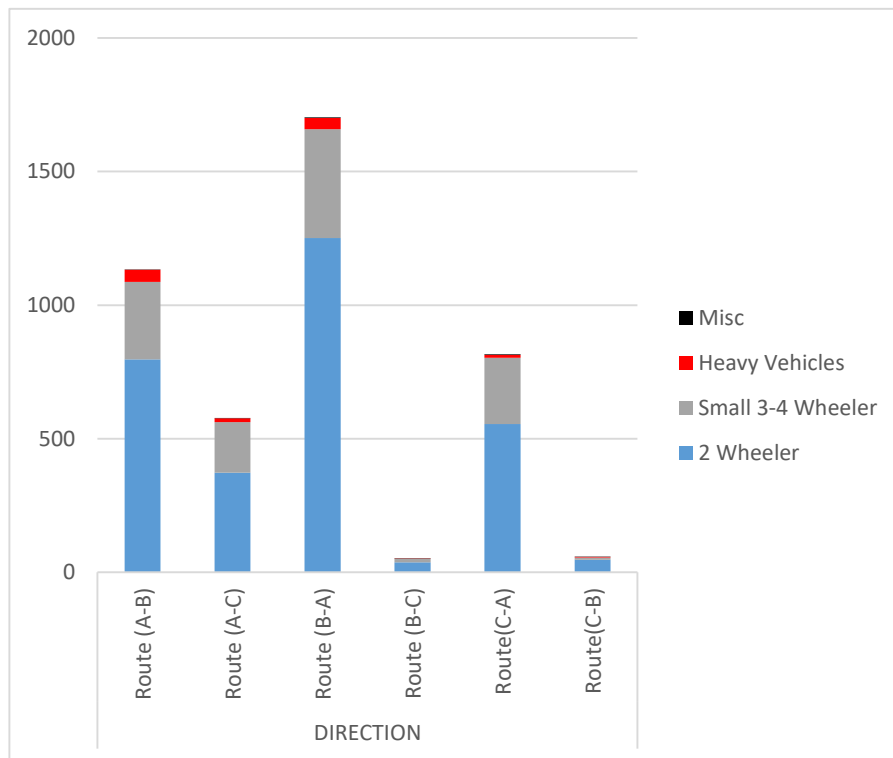


Figure 47 Traffic Count at Nakkhu Junction (Morning 9:30 AM - 10:30AM)

Figure 47 shows the morning traffic count. The highest number of vehicle is the two wheeler at this time of the day. An average of 3,060 two wheelers cross this junction on a daily basis as per the data recorded. While small vehicles are seen to pass this junction on an average of 1,157 in numbers while heavy vehicles and other vehicles are seen less than 130 in number. Further, it can be seen that majority of the commute is from point A - B and from point B - A. An average of 1,133 vehicles from A to B and 1,704 vehicles from B to A. This shows that most of the vehicles are traveling either from Ekantakuna towards Bhaisipati or from Bhaisipati to Ekantakuna. The data shows that commute between Bhaisipati and Medicit is minimum at this time of the day. Travel between points A and C is also significant with about 1,384 vehicles moving between them. This shows that most of the vehicle movement is commuting to work

places and the main places of employment is Nepal Mediciti hospital, banks and offices in and around Bhaishipati area and the core city and CBD.

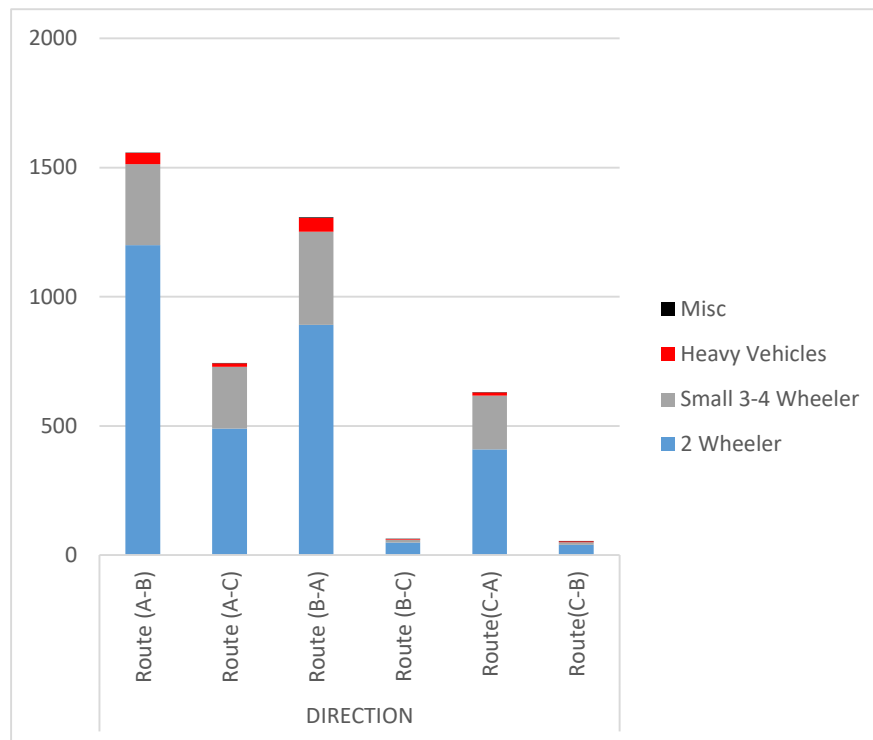


Figure 48 Traffic Count at Bottleneck Junction (Evening 4:30 PM - 5:30 PM)

Figure 48 shows the traffic count of the evening. The highest number of vehicle is the two wheeler at this time of the day. An average of 3,080 two wheelers cross this junction on a daily basis as per the data recorded. While small vehicles are seen to pass this junction on an average of 1,141 in numbers while heavy vehicles and other vehicles are seen less than 150 in number. On an average 4,360 vehicles pass this junction in an hour during rush hour traffic. Further, it can be seen that majority of the commute is from point A - B and from point B - A. An average of 1,558 vehicles from A to B and 1,307 from B to A. This shows that most of the vehicles are traveling either from Ekantakuna towards Bhaishipati or from Bhaishipati to Ekantakuna. The data shows that commute between Bhaishipati and Mediciti is minimum at this time of the day.

From these data we can infer that most of the congestion and waiting in the junction happens as the vehicles moving from point B to A have to stop n wait to allow vehicles moving from point A to C. Traffic flow from A – B and A-C are not affected as they don't have to stop n wait in the junction.

7.7. Travel Time Data Analysis

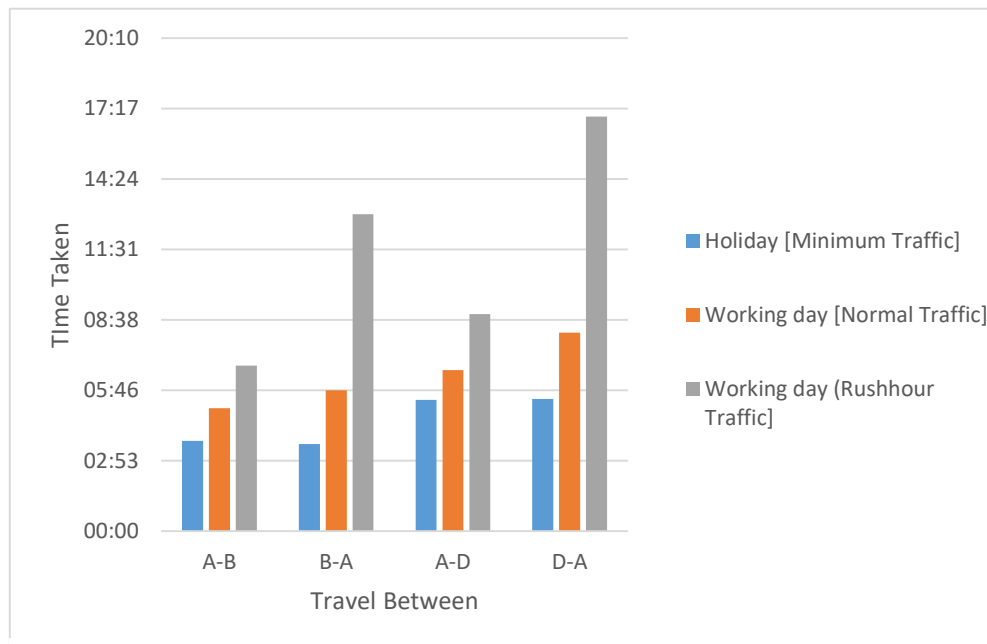


Figure 49 Travel Time between A-B and A-D in Different Traffic Conditions

From Figure 49, while moving from B and D to A, we can see that the travel time increases significantly during rush hour. As the traffic volume increases during the office rush hour, more vehicles ply on the road. This causes a lot of congestion in Nakkhu junction as there is traffic flowing in multiple direction from one junction. With roads narrow and in poor condition at the junction, the speed of traffic is also reduced compared to if it were wide n smooth roads. So, as vehicles increase, traffic becomes slower n have to stop more often. The wait time increases and ultimately travel time increases. Even the short commute of 1.8-2.7 kms become a long task. Factoring in the congestion, slower driving speed and wait time at the junction, the time to travel between these points increases by over three times compared to the time taken during the time of nominal traffic volume and by over two times compared to normal traffic volume.

In a hypothetical scenario, if the route through Vinayak Colony (Route 2) was open, vehicles would travel through said route of 2.6 Kms from B - A and 2.8 Kms from D – A. Considering there is minimal congestion on this route, as there is a free left moving from point C to A, taking an average speed of 30 Kmph (similar to the average speed of travel in the nominal traffic from route 1), the time to travel from point B to A via route 2 is 5:12 and D – A is 5:36. (Figure 50) This is much faster than the time taken in

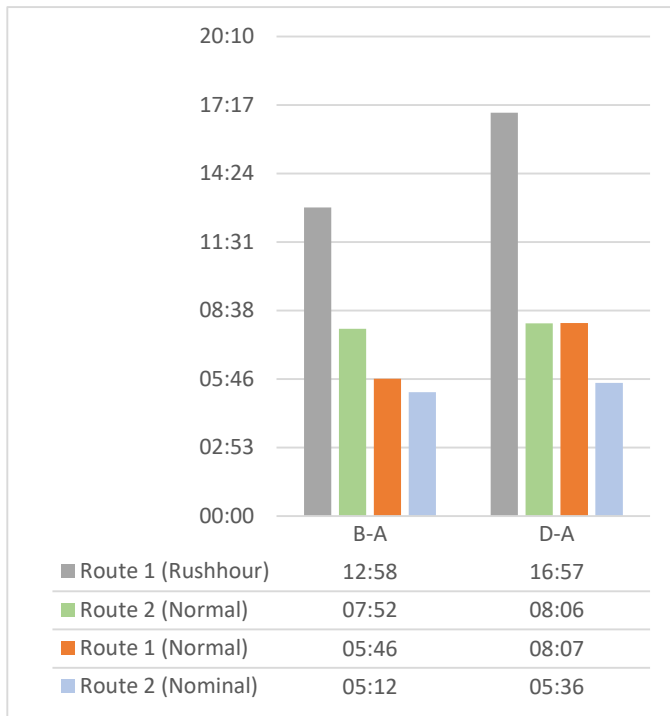


Figure 50 Time Comparison Between Routes 1 and 2

rush hour traffic and sitting though congestion of bottleneck Nakkhu junction. It is also a little faster than the time taken in normal traffic conditions via route 1. Similarly, taking an average speed of 20 Kmph (same as the average speed of travel in normal traffic conditions in route 1), the travel time via route 2 is 7:52 from B to A and 8:06 from D to A. This is still significantly shorter than sitting through rush hour traffic and congestion and similar to

normal traffic in Route 1. Figure 50 shows that Travelling through route 2 in nominal traffic would decrease travel time by more than half while travelling to A, from point B and D as compared to the congestion and having to endure long wait times. Even if there was some traffic, travel time is still more than twice as fast as moving in congestion through route 1.

From these data we can infer that blocking of an access way can cause issues in mobility for the larger community that the gated community is located in. The size of the gated community is relatively small. However, when the size enlarges and providing a thorough fare becomes more challenging. The community would then be seriously infringing upon and causing restrictions on the right to easy access of services and facilities of the larger society and community. For what could have been a short walk, the gating would compel it to turn into a drive and a short drive could turn into a long commute through congested streets. It is not fair to the larger community and society to have to travel a lot longer and sacrifice mobility and accessibility for the ease of a small group of people. It is not justified that one person or a group of people cause discomfort and disadvantage to other people while utilizing their rights.

7.8. Population Data Analysis

From the satellite history data (Figure 36), we can see that the settlement of Bhaisipati is growing rapidly. Around 2001A.D. it was completely agriculture land with the exception of a few houses and buildings scattered in the area. Around 2011 A.D., it was started growing with gated communities, land pooling and other housing colonies starting its development. The marketing of Bhaisipati as an elite settlement started. In 2011 A.D., the population density of Sainbu area was 47.87 ppha. The growth rate of Sainbu observed from 2001 to 2011 is 14.5% (CBS, 2011). Today, considering the growth rate of the area the density is 204.76 ppha. If the population of Sainbu individually were to increase at the same rate, it will reach up to 3.6 lakhs by 2031 A.D. Figure 51) making the density of Sainbu or 875 persons per Ha, which is unlikely.

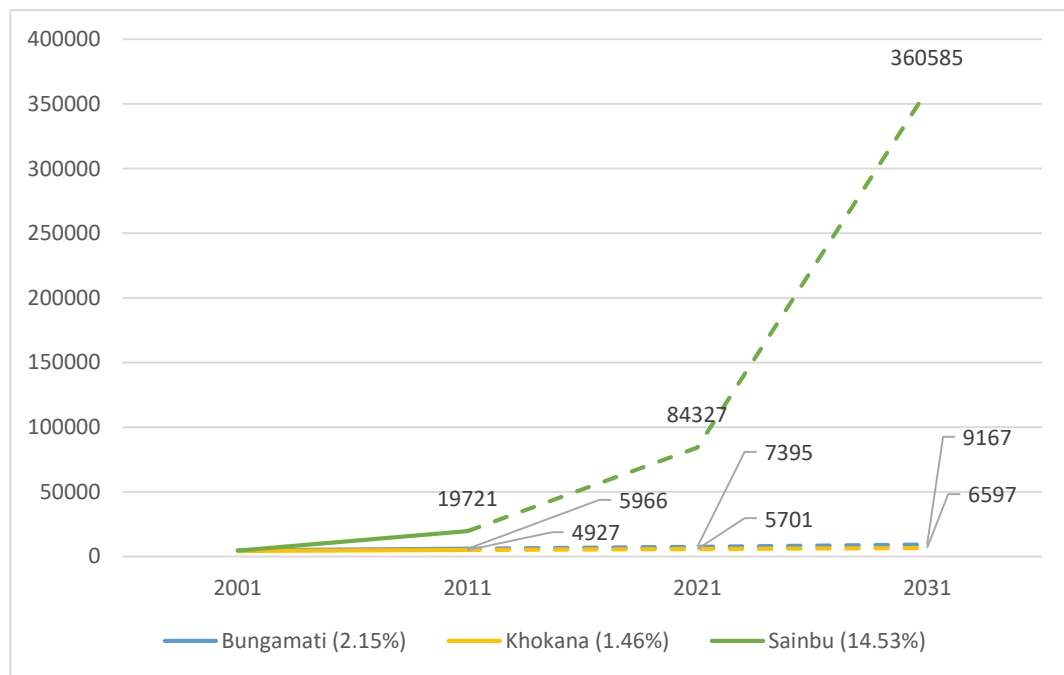


Figure 51 Population Projection for Bungamati, Khokana and Sainbu individually as per current Growth Rate

As the population density increases, Sainbu will face congestion and the growth rate will reduce and plateau. Then the growth and development of population and infrastructure will move further south towards Bungamati and Khokana where the growth rate is comparatively less at 2.15% and 1.46% respectively. (CBS, 2001) (CBS, 2011)

Growth rate of Sainbu, Bungamati and Khokana area combined is 8.05% while the growth of Lalitpur as a whole is only 4.63%. (CBS, 2011) As the population density of Lalitpur was 149.66im 2011 which is the limit for allowable density for a medium density city according to the Planning Norms and Standards (MoUD, 2015). The population growth will slow down as it moves towards the maximum allowable density for a metro city of 200-300 ppha. (2015) So, assuming that the Sainbu, Khokana and Bhaisipati area have a lot of potential to grow, and will grow more rapidly than Lalitpur, the growth at the rate of 8.05% is assumed. With this in mind, the population projection of the area is calculated and studied. This projection shows that, the population in this zone shall reach up to 1.5 lakhs by 2031 A.D(Figure 52). This population would mean that the density of the area would reach 137.07 ppha. So, by the year 2031 A.D., the Sainbu, Khokana, Bungamati area will be approaching the status of a sub-metropolitan city as per the guidelines in Planning Norms and Standards. (2015)

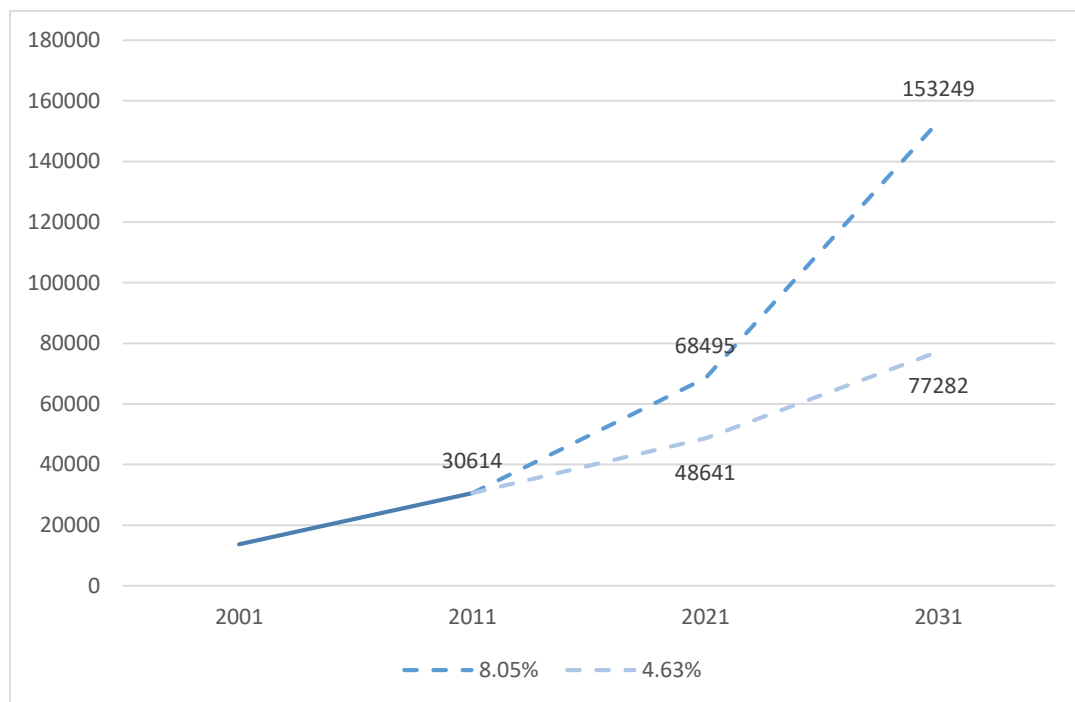


Figure 52 Population Projection for Bungamati, Khokana and Sainbu Area as a Whole

7.9. Vehicle Data Analysis

As the settlement in Bhaisipati continues to grow, more vehicles will run on the road. In Bagmati zone alone there was an addition of more than 1.2 lakh vehicles in fiscal year 74/75 (Figure 53) taking the total number of vehicles registered to over 11 lakhs. (DoTM, 2018) The ownership of vehicles is on an increasing trend.

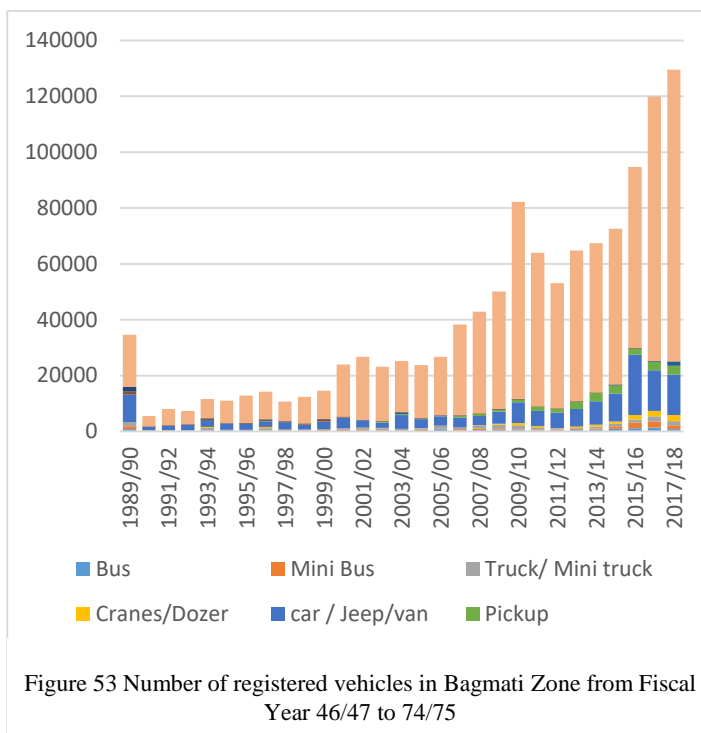


Figure 53 Number of registered vehicles in Bagmati Zone from Fiscal Year 46/47 to 74/75

According to Senior

Superintendent of Police (SSP) Basanta Kumar Pant, around 97 percent of the vehicles registered in Bagmati zone are private and traffic management has witnessed challenges as 90 percent of the vehicles registered in Bagmati ply on the Valley roads. (Samiti, 2018) Among registered vehicles in Bagmati, more than 921,000 are motorbikes. Likewise, there are 48,242 registered bus and trucks, 13,553 power tillers and dozers, 142, 339 cars and jeeps and 6,330 tempo and microbus. (DoTM, 2018)

Furthermore, JICA has predicted increase in ownership of cars by 2.4 times and bikes by 1.72 times in the valley. (JICA, 2012) However, the increase in vehicles in Bhaisipati could be more than predicted increase in the valley. Around 8-9 lakhs private vehicles already ply in the valley. The valley is home to a wide range of people spread across various backgrounds and economic class. According to different city models in history: Burgess's concentric ring model, Hoyt's sector model and Harris and Ullman's multiple nuclei model, the CBD starts to become crowded as many people migrate to the cities in search of employment and start to live near the CBD. As it starts getting crowded, the peace, quiet, quality of life enjoyed by the residents starts to be affected. The population with a higher economic status who can afford to commute to the CBD, in their personal vehicles on a daily basis, tend to move towards the outskirts and suburbs

for a quieter life with open spaces and a better quality of life. This peri-urban development is fuelled by these people moving away from the CBD. These theories can be observed in the Sainbu-Bhaisepati area as well. Bhaisepati has been targeted as a prime location for luxurious living by many group housing companies. The government ministers' quarters are also proposed in the area. We can assume that because of all this, the majority of population moving to this area shall own their own personal vehicles. Thus, the number of vehicles in Bhaisipati will be higher than projection for the entire valley.

8. FINDINGS AND DISCUSSION

8.1. Population and Traffic

The settlement of Bhaisipati is growing rapidly. It started around 2011 A.D. with a number of gated communities, land pooling projects and other housing being introduced here. As the density increases, Sainbu will face congestion and the growth and development of population and infrastructure will move further south towards Bungamati and Khokana and the density of the area would reach around 135 ppha by 2031 A.D. The Sainbu, Khokana, Bungamati area will be approaching the status of a sub-metropolitan city as per the guidelines in Planning Norms and Standards. (2015)

With already a total of over 11 lakhs vehicles registered, around 8-9 lakhs private vehicles already ply in the valley. In the Data Collection Survey on Traffic Improvement in Kathmandu Valley, JICA has predicted increase in ownership of bikes and cars by 1.72 to times in the valley. However, the increase in vehicles in Bhaisipati could be more than predicted increase in the valley, as the majority of population moving to this area shall own their own personal vehicles. Thus, the number of vehicles in Bhaisipati will be higher than projection for the entire valley.

With only one major access road connecting this area to the main city and CBD, the Ekantakuna - Tikabhairab road will see a lot of vehicles unless alternate route or transport options are provided. The Nakkhu junction is a bottleneck spot and is the main area for traffic jam due to the long wait time while passing through or crossing said junction. With the population of the place about 60 thousand, we see an average of 4,000 to 4,600 vehicles pass through this junction. The population of the place is projected to reach around 1.5 lakhs. We can see the travel time increase by about 3.1 to 3.6 times during rush hour. The area is still in the process of development and densification. If gated communities with an option for thorough fare allow vehicles to pass, an alternate route is provided. This would open up alternate routes to access the city through Chobhar, Mahalaxmasthan or Satdobato. This will ease traffic congestion and reduce travel time.

8.2. Policy Findings

The Ownership of Joint Housing Act defines and describes “joint housing” in terms of apartments. Here, joint housing is defined as a building or group of buildings with multiple floors with different apartment units where two or more families can live in a single building. The building or a cluster of buildings can be within one parcel of land with the open spaces as common collective spaces. The Act does not allow use of these collective space for any private use or demarcation and prohibition of land. The act gives power to the promoters or elected committee of the apartment owners to maintain, protect and repair the collective spaces. However, the apartment owners do not own parcels of land within the complex privately. They get a share of the land only in case of complete destruction of the apartment buildings. In a housing colony, each resident is a land owner and owns their parcel of land separately. There are roads providing access to each land or house. These houses do not conform with the definition of joint housing or apartment explicitly mentioned in the act.

The Public Road Act defines “public road” as roads that is not privately owned. So any road providing access to more than one parcel of land or more than one landowner is considered public road. According to this, the roads in the housing colonies appear to be “public roads”. This act prohibits any individual or group from causing any obstruction of movement on these public roads in any way. It also prohibits anyone from performing any act as to barricade, obstruct or damage the area within the road border without permission from the Department of Roads or the local authorities.

The Lands Act describes provisions and prohibitions of ownership of land to any individual, committee, institute or cooperative. It states that anybody, be it individual or group is not allowed to own more than 25 ropani of land in Kathmandu valley. It mentions that the individual or group is allowed to own 5 ropani more for housing purposes. It provides exceptions to institutes and other groups to own more land by special permission on the pretext that the 25 ropani is not sufficient for the group or individual to run their operations.

Housing colonies are much larger than 25 ropani and thus cannot be owned by the committee. The ownership of joint housing act does not cover the housing colony

specifically. Thus, power cannot be given to the committee to control common areas as the common areas in housing colonies are “public roads” as per the public roads act, as opposed to the parks, utility spaces, basements in apartment complexes.

So, from a legal stand point, the gates in the boundaries of housing colonies does not appear to be legal. Thus, if ordered by the Department of Roads or by the local authority, the gate restricting movement shall be removed.

The Building Byelaws is a document explaining and listing all the byelaws and regulations to be followed while planning, designing and constructing any infrastructure or building within the valley metropolis and neighbouring VDCs. It has provisions for the permit and construction process of a variety of building types and sizes.

This document does not provide specific regulations and guidelines for group housing. It lacks detailed criteria one has to follow to be permitted to construct a group housing development. It lacks provision for the ownership of land common land within the group housing boundary.

The Town Development Act made provisions for reconstruction, expansion and development of existing towns and also the construction of new towns. This act mainly provides for and caters to the planning and development of towns and other development areas performed by a government body. It however has provisions and restrictions for private institutions wishing to perform development activities in the planning area. This facilitates an opportunity for the government body to implement regulations to ensure the development caters to and facilitates the town and community as a whole and is not completely secluded for the use and benefit to private parties.

The Right to Housing Act was made to provide for the right to housing of every citizen of the country. The Act relates to citizen’s rights and duties related to housing. It lacks provisions related to gated community and group housing. It does not specify the rights, restrictions and responsibilities of residents or owners of plots within the group housing to the common areas.

The Land Use Policy 2015 aims for social, economic and ecological development by optimum use of available LLR thus leading the country towards prosperity. Policies 2 and 4 of this document provide for the power and responsibility to all levels of government from local to central or federal bodies to formulate a land use plan suitable for their area and enforce the same. This gives local bodies a new and unique opportunity to perform proper urban development plans, specify the usage of land and responsibilities that a private or government body have to fulfil and abide by while performing planning, construction and development.

The National Urban Development Strategy aims to lead the process of urbanization by integrating actions of important urban sectors through strategies that will help shape the future of the urban areas. Strategies mentioned in the document targets to continually study urban patterns, assess risk and hazards, evaluate issues and shortcomings in the plans and policies. This gives opportunities to notice and learn from the drawbacks and obstacles in safety, security, convenience and development. The commitment to review and revise building code/regulations/guidelines and planning byelaws periodically then provides room and opportunity to improve said regulations and guidelines to help local bodies understand and enforce the codes and byelaws.

Even though there does not seem to be specific rules and regulations regarding design and development of private housing colonies, policies, strategies and acts have provisions and opportunities for different local or federal government bodies to initiate the formulation and enforcement of rules that will help ensure public wellbeing along with privacy for the owners of the plots inside a gated community.

8.3. Views of Locals

During the research the views of the locals, the local traffic management personnel and their representatives were collected. All agreed that that traffic congestion was becoming a problem and it was getting worse as the settlement densified. Everyone had an issue with there being only one road to the city that was usable and expressed the need for more routes as alternates. While many people had not considered the possibility of making roads through gated communities.

Talking to the traffic management personnel revealed some hidden and some obvious shortcomings in the traffic management scene. Mr. Ram Singh Bhandari, a traffic police who is regularly stationed at the Nakkhu junction shared some of his experiences with regards to the difficulties in traffic management at the place. First and foremost, he talks about the road condition, road infrastructure and public behaviour. The road condition at the junction is quite poor. The black topping has eroded and a lot of pot holes are seen. This doesn't allow the vehicles to move smoothly and with so much cross flow of traffic, it adds to the travel and wait time. Another traffic Ms. Srijana Thapa pointed out that the road infrastructures were inadequate as it was narrow, lacked lane markings, footpaths, adequate drains and proper traffic management system. This meant unsafe roads for pedestrians, vehicles as well as traffic personnel. This is amplified by negligence and ignorance of the public. Not following traffic rules, lane discipline, haphazard pedestrian crossing, arbitrarily walking on the roads, motor bikes not waiting their turn and obstructing oncoming traffic etc. are among the issues with public behaviour. The traffic personnel mobilised are not adequate to deal with so many offenders while managing traffic flow. This creates obstacles and dangers in the flow of traffic.

They both agree that letting the traffic flow freely often results in lesser wait time and the congestion seems less. However, the road becomes very chaotic and more dangerous to all the parties involved. They agree that widening the road will help the congestion but insist that that is not the solution as currently the cross flow is the main obstacle. They emphasise on the fact that providing new alternate routes, opening and maintaining available alternate routes or reducing cross flow (possibly by making one of the roads one way) will help solve the issue.

Mr. Gopal Dangol, a resident and member of ward 18 discussed in length about the shortcomings and possibilities of rectifying these issues but noted the constraints in budget and legal frame work for the same. He emphasized that alternate routes are needed to curb the increasing demands and traffic flow. Stating that the area is growing rapidly and soon the traffic conditions would be similar to Koteshwor area, he said route to Chobhar and Balkhu, a Nakkhu corridor connecting to Bagmati corridor, opening the route to Mahalaxmasthan through Nakkhudol, opening the route to Sunakoti via Karyabinayak could be possible routes. He seemed reluctant to consider opening a route

through Vinayak Colony as they had permission from the then local authority for the gating. He however mentioned opening gates after construction is a difficult task, provisions should be made before hand so that a company building a housing colony can plan for a thorough fare without hampering their security. He mentioned the lack of proper prior planning and weak governance was also a limiting factor in development as at that time the government didn't implement the Town Development Act 2045 B.S. properly and the buildings and infrastructures have been built with proper approvals. Now it becomes next to impossible to remove such infrastructure for development process. Thus introduction of roads, road widening and other similar development works are in snag.

Stating these he mentioned that planning ahead is necessary and it is not too late for the area. Proper planning, informed and responsible public and a dedicated government body is necessary to see change.

Upon discussion with locals of the area who live outside the gated community, It comes to light that that area is seen as a separate unit. They don't think of the colony as part of the community, it is see as a secluded unit that is not to be messed with. Mr. Manoj KC, a resident in the Bhaisipati area talked about the congestion and condition of road and infrastructure with some frustration. He said that it was shameful that the government calls it part of the metropolitan city, levies a large tax and provides them with nominal facilities. The roads are limited, congested, and unmanaged, the road conditions are in a sorry state, the community lacks public infrastructure were among his chief complaints. Mr, Sonam Magar joked that the only alternative seemed to be building flyovers as houses built before with proper permission from the government bodies cannot be pulled down without proper compensation and the government cannot provide the free market rate.

They maintain that only the traffic management are not to be blamed for the congestion as public behaviour, working conditions, road conditions are all part of the problem. While they agree that alternate routes would help immensely with the congestion, they were unaware of the possible route through Vinayak colony that is blocked and said the route connecting to Mahalaxmasthan was in a very poor condition and to risk damaging their vehicles would be foolish.

The residents of Vinayak Colony say that the congestion is not major while going from route 2 as there is free left and they don't have to stop much. They also said that if they are not going towards Ekantakuna or Satdobato, it is easier to go through Dhobighat as taking a U turn to move towards Sanepa is difficult in the new layout of the ring road. They stated that the North entrance is usually closed for vehicular entry even for the residents and act only as a secondary entrance in case it becomes necessary and as a pedestrian entrance. They also mentioned that the road adjacent to Vinayak colony (route2) is now open to the public after the issue was brought to light and a community meeting held. The guards stop and enquire before letting a private vehicle of non-residents pass but they have separate entrance for the lower and upper colony and they allow vehicles to pass albeit with some hassle.

They contest the idea of opening the gates for the public in a gated community with concerns of safety stating that opening the gates would mean it is no different than normal community and the premium paid for the exclusive facilities would be a waste. They however agree that placing byelaws and acts beforehand requiring developers to provide a certain space and route through for the public will go a long way in improving a sense of community and increasing mobility and accessibility.

9. CONCLUSION AND RECOMMENDATION

The study shows that restricting access in a growing settlement can cause congestion and elongate travel time. Longer travel times means lesser accessibility and mobility. Gated communities with the ability for thoroughfare limit access and contributes to congestion. Limiting access results in lower mobility, ease of access is reduced and time taken to travel potentially increases significantly.

Looking at the legal standpoint, there can be seen a gap in the availability of specific laws and regulations regarding gated communities. While there are explicit laws for apartment complexes, on the rights, duties, allowances and prohibitions. The law does not have a provision to allow housing colonies to place a gate and restrict access to the area.

However, despite the legal provisions and documents not seeming to have specific rules and regulations regarding design and development of private housing colonies, there are policies, strategies and acts that have provisions and opportunities for different local or federal government bodies to initiate the formulation and enforcement of rules that will help ensure public wellbeing along with privacy for the owners of the plots inside a gated community.

Installing a gate and privatizing these roads means the residents usually take responsibility of protection and maintenance of the areas within the boundaries and the local body does not interfere. This is usually accepted and promoted around the world by local or government bodies that lack the financial strength and resource to develop land on their own. So they rely on private parties to help develop some portions of the land, as is the case in Nepal despite the lack of legal provisions.

Access however, should be granted to the public in locations where there needs a thoroughfare and ease congestion. All areas in the process of developing and densification needs adequate roads to access such areas. Strategic planning to provide adequate and accessible roadways is important. Social justice is crucial in these terms. One person or a group of people should not be infringing upon the rights of others while exercising their own. Everyone has a responsibility and duty towards the society they live in. In order to plan and develop a gated community, the developer must ensure

thoroughfare such that the effect on mobility and accessibility is minimum or not at all due to the existence of said gated community.

Adequate and relevant laws on the rights, provisions and prohibitions that gated communities, their residents and committee should abide by needs to be formulated. The competent authority should formulate and regulate proper process of approval to own, construct, sell and run these communities. These policies, regulations and process need to be made clear and readily available.

Thus, accessible roadways should be maximized as far as possible. This shall include opening gated communities or requiring gated communities to provide an accessible road across the enclosed area where necessary. Adequate laws regulating housing colonies and the requirement of access should be formulated. Planning policy and development guidelines should include the need for accessible and inclusive development.

9.1. Policy Recommendations

The research found that Nepal has some policies that provide room that enables government bodies to easily formulate guidelines, and enforce regulations to monitor, maintain and ensure proper planning, design and construction of development projects. With this provision, these bodies can implement rules and mandate that access to road and some public infrastructure be made available to the general public when providing permits to institutions wishing to build these group housing projects. They can provide compensation or rebates for the same to the institution. This helps ensure inclusion of the public and helps garner a sense of security while discouraging a sense of discrimination and fear.

Specific laws, rules and regulations focusing on group housing is also necessary similar to the ownership or joint housing act. This should take into consideration the housing colonies built by builders and developers along with the provision or restriction of gating done locally by the locals and community members. It should specify the provisions that allow, restrict or prohibit gating. It should mandate that an alternate road

and access to amenities be provided around the site to be eligible for fencing or gating a community.

Section 3 of the Public Road Act should add a classification of roads located within gated communities to help formalise and make use of this road differently from that of the general urban roads. This way sections 18 and 19 can provide for different power of the government, the public and the residents of gated community and have a separate set of prohibitions.

Section 2 of The Ownership of Joint Housing Act needs to include group housing, and community cluster of houses in the definition of “Joint housing” and not limit the definition of “joint housing” to apartment complexes. It should modify the term “Apartment owner” to “Property owner” to include house owners rather than just apartment owner. Section 16, 17 and 18 should mention the rights of both apartment and house owners. The act mentions apartment built by a company referred to as “promoter”. It should specify if the law binds for joint housing built by individuals or a group of individuals for private use.

Section 5 – Sub-section a, b and c of the building Byelaws should iterate specific criteria for the planning, construction and ownership of joint housing, not just the documents required. It should also mention in detail the permit process and restrictions for these developments.

Section 3, 4, 8 and 9 of The Town Development Act should include the possibility or prohibition of putting up gates by the unanimous decision of some local property owners in various circumstances. Section 10 should include the power of the committee to prohibit or demolish if already built gates and fences that does not follow the guidelines and prohibitions imposed upon the locality by law.

The gated communities started out with a small number of houses in the early 2000s but now a gated community houses more than 150-200 houses and the trend of having more is increasing. This can cause a major issue on mobility and ease of access to the general public living outside these communities if the planning, design and construction of these developments and gating of a community by the unanimous decision of the members of the committee in that area is not checked.

9.2. Strategy Recommendations

While forming strategies and plans, it is vital to keep the wellbeing of all the general public in mind. Extensive, detailed and fair plans which ensures that both parties are fairly treated is necessary. The community wants safety, security and exclusivity. They have the right to that status. However, they also have a duty to not interfere and hamper the accessibility, wellbeing and quality of life of the people outside their gates. The general public also has the right to infrastructure, amenities and facilities. So, there should be penalties to the parties restricting and infringing upon the rights of others for their benefit in a community and town development scenario. Basic accessibility and mobility should be mandated and communities that provide amenities to the general public should be rewarded or encouraged with concession on tax and rebates on expenditure.

9.3. Further Research

Urbanization is a continuous process. The towns, cities and metropolis are ever evolving with the passage of time and course of development. This research focuses on only how gates affect mobility. Gates, gated community, their size and dynamics also has a range of other effects in the locality. The social, emotional, economic, psychological, administrative and governance factors in the community, society, cities and country as a whole is not considered here. Currently, there are only small lifestyle and prestige gated communities with some city perches that seek some security and exclusivity. If left unregulated it could enlarge in size with their own administration and governance within that the city administration have no right. This will cause problems in terms of various factors ranging from legal to administrative or governance.

Thus further research on the following categories are recommended:

- Size of gated communities and how they affect the locality.
- Socio-economic impacts of gates and gated communities on the society and city.
- Challenges on law enforcement and administration within gated communities to the city.
- How does gated communities create social divide among the community members and what are the ways to mitigate them?
- Does the seclusion of the residents and exclusion of the public by the gates and fences of the gated community create discrimination and hostility in society?
- How can the planning, design and development of gated communities be used as an opportunity to enhance the sense of community and create a better local area?

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APPENDIX 1: MATRIX SHEET

S.No.	Comments	Response
1.	Re-check number of housing companies registered	Addressed in page 35
2.	Recommendations need to be more specific	Addressed in page 97-98
3.	Discuss the relevance of Social justice	Addressed in pages 38,84,96
4.	Talk about size specific design and development guidelines for gated communities	Addressed in page 100

APPENDIX 2: PUBLISHED ARTICLE

Impact of Gated Communities on Local Mobility

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Abstract

Gated communities are residential areas with restricted access designed to privatize normally public spaces. These secluded clusters of houses form a separate community within its walls. They often have facilities and infrastructures that are not open to the public. Mobility is the ability to move or travel around easily. Kathmandu has seen a surge in the development of gated communities. These communities restrict access and contribute to densification while reducing access. This research aims to identify the legal provisions and restrictions of these gates. It shall look into if and how accessibility is or can be affected. A literature review, and review of legal documents related to housing, public roads and lands confirm that the law for approval and allowance of construction of housing colonies and particularly gates in such colonies are lacking. Direct observation and key informant interviews reveal that accessibility is a growing issue with the increase in densification and opening gates of communities should be an option to increase accessibility and mobility.

Keywords

Gated community – Accessibility – Mobility – Housing colony – Apartment

1. Introduction

Gated communities are residential areas with restricted access designed to privatize normally public spaces. A gated community is a housing development on private roads closed to general traffic by a gate across the primary access. The developments may be surrounded by fences, walls, or other natural barriers that further limit public access. [1]

Kathmandu has seen the emergence and development of many gated communities in the past decade. These include housing colonies, apartment buildings and private group housing. These secluded communities cause various impacts in the surrounding locality. They may be economic, social or environmental albeit not all are negatives.

People, residents go to these communities in search of security and a higher standard of living. These communities play a role in the land usage, land value, urban management of the area. There are meanwhile some restrictions in the development of these privatized public spaces [2]. However it is the absence of these groups from most aspects of city living that creates a wider problem for those concerned with the quality of civic spaces and institutions. [3]

Oxford Learner's Dictionary defines mobility as the ability to move or travel around easily. It says mobility is the ability to move easily from one place, social class or job to another. It iterates how easily and conveniently a person can travel to and from places. It gives an idea of how easily can a person access services and facilities. Gated communities come up and densifies settlements. However, it closes its gates to the general public who happen to live outside the gates. This can cause various issues on mobility and ease of access. A possible alternate path or access way is blocked by the community. Where with densification ease of access should increase, gated communities form barriers to the accessibility of various infrastructure and services.

With rapid urbanization and urban densification in Kathmandu in recent years, people have started seeking housing and residence in the peri-urban areas of Kathmandu. People migrating in from outside cannot afford to buy land in the main city so they move to the outskirts and suburbs, or people traditionally from the core cities move out due to congestions. This trend of gentrification has fueled the boom in the development of gated communities. People seeking affordable housing prefer to avoid such communities, while people seeking comfort,

luxury and security gravitate towards gated communities. This however comes at a premium price. Gated communities reflect an urban entity that is physically and often socially and economically differentiated from the surrounding urban environment. [4]. With this kind of seclusion and isolation, there tends to be a disconnect in status, class, amenities, services, facilities and lifestyle among the locals. These secluded clusters of houses form a separate community within its walls. They often have facilities and infrastructures like parks, department stores, swimming pools, community halls among others. The public or anyone not part of the gated community is not allowed in and not allowed to use any of the amenities. Emergence of these communities challenge the spatial, organizational and institutional order that [5] that has shaped Kathmandu. Likewise, communities that have connections to two or more roads at its boundaries benefit from alternate route options. However, residents excluded from this walled housing cannot use said road and ease of access is compromised and mobility is affected.

Strategies, policies, plans, including land use policies, development strategies, housing byelaws, infrastructure development plans need to take into consideration the impacts these communities have on the surrounding areas to formulate rules, regulations and policies. The thought out strategies thus implemented will help regulate these developments and ensure all parties have equal, easy access to infrastructure and reduce social divide and benefits.

1.1 Research Question

- What are the impacts of gated communities on surrounding communities in the aspect of mobility and accessibility?

1.2 Research Objectives

- To measure impact of gated communities on local mobility using specific parameters
- To examine the bottlenecks created due to restricted access from the gated community
- To review the legality of gated communities and provide possible policies to tackle issues

2. Research Methodology

Ontology is among the main elements of a research paradigm. It is the study of reality. It forms the

understanding of the researcher and helps formulate the progress of the research. Here, the ontological claim is that “Gated communities reduce ease of access while increasing density of a locality”

Epistemology is concerned with the nature of knowledge and ways of knowing and learning about social reality [6]. It is the means or method to be followed to learn or shed light on the ontological claim of a research.

The methodology for the research is defined by the paradigm it is following. Here, this research shall follow a pragmatic paradigm where it will take into account both qualitative and quantitative data to induce conclusions.

This research is conducted based on the inductive approach.

Inductive approach generally means the bottom up approach which starts with observation and ends in theory or conclusion. In this logical framework, the observations are made first. This can lead to patterns and regularities shall be abstracted. Following that hypothesis are proposed and tested. After that a theory or conclusion is drawn in relation to the initial ontological claim. In short, inductive approach is starting with a statement, observing patterns and ending with generalization.



Figure 1: Inductive Approach

However instead of perfect induction, the inductive approach will be based on imperfect induction. This shall be Inductive Approach based on limited observations with generalizations, and a wide use of the principle of probability. Nonetheless, efforts will be geared towards making more findings and collecting data so that there is a higher likelihood that the generalization made at the end of the study would be closer to reality.

3. Policy Review

The Government of Nepal has prepared various laws and legislation regarding Housing and group housing. The following legal documents are prepared related to community housing, land and joint ownership.

3.1 The Lands Act, 2021 B.S. (1964)[7]

As per Chapter 3, Section 7, Sub-section (1) the upper ceiling of land allowed to be owned by a landowner, in any way, is not more than 25 Ropani in Kathmandu valley. Moreover, as per Section 7, Sub-section (2), notwithstanding anything contained in, Section 7, Sub-section (1), any person or his or her family as a land owner may own, not exceeding the upper ceiling of, 5 Ropani of land in Kathmandu valley for their housing purposes in addition to the land referred to in Section 7, Sub-section (1).

Section 12, iterates the provision for exemptions from the upper ceiling contained in Section 7. The 8th amendment of the act in 2076 B.S. (2020 A.D) Section 12, Sub-section (g) and Section 12A mentions land owned by a company or association as the landowner, exempt from the upper ceiling specified in Section 7, provided that the land ceiling is not sufficient or is inadequate for the company or association to run its operations and acquires special permission from the government of Nepal for the ownership of such land.

According to this lands act any landowner shall not own land more than 30 Ropani for any foreseeable purposes in the Kathmandu Valley.

3.2 Public Roads Act, 2031 B.S. (1974)[8]

Chapter 3 Section 18 describes the power of the Government of Nepal or the Department of Roads to remove goods causing obstruction to movement on public roads. Section 18 Sub-section (4) states that in addition to any goods left, placed or thrown on the public road, anything including any arm or branch of a door, tree or wire, that is held, installed or made with a house or wall on either side of a public road as to project towards the road and causes obstruction to the movement on the road, the Department of Roads may issue an order to the concerned person to remove such obstruction or arrange the goods in a manner not to cause obstruction within a reasonable period of time as specified in the order.

Chapter 3 Section 19 states the prohibition on doing any act on public roads or road border without obtaining permission. According to Section 19 Sub-section (1) no person shall build an access road joined to a public road or dig or demolish a hole or ditch on a public road or within the road border or install or place barrier, peg or fort on the public road or build a house or shed thereon or cultivate a land within the road border or do any other similar act

without obtaining the permission of the Department of Roads.

As this act defines public roads as roads not subject to personal possession by any individual or family. This implies that when a road is used for access or otherwise by more than one household or parcel of land, it is deemed public road. The act prohibits any person, individual or group to obstruct movement on these public roads in any way. It also prohibits any individual, family or landowner from doing any act as to barricade, obstruct or damage the area within the road border without permission from the Department of Roads or the local authorities. Failure to do so shall give the Department of Road, the authority to carry out the removal or demolition of the said obstruction, by their own employees or others on a contract basis.

3.3 The Ownership of Joint Housing Act, 2054 B.S. (1997)[9]

Chapter 5, section 16, mentions that an apartment owner has right over collective areas and facilities such as land of joint housing, the structure of the building with its services (sewerage, fire escapes, way in and way out), amenities (basement, solar, courtyard, garden, parking lots and go-down), generator post and guard post, facilities like electricity, gas, parts arranging, making of cold and hot water and parts of the building used for heating and air conditioning. An owner is also subjected to the rights to items of collective use such as elevators, pump, tanks, motor, fan and garbage container. As per section 17, no division of these collective areas and facilities are allowed. While Section 18 states that an apartment owner shall pay the promotor or committee for maintenance, cleaning and upkeep of Collective areas and facilities, Section 19 denies the right to refuse to pay for them. In case of non-payment issue, Section 20 gives the right to the promotor or committee to withhold the use of any collective area and facilities and also prevent transfer of such apartment to any other person in any manner.

In case of the complete destruction of joint housing in any manner, Section 22 subsection 1 states that the land area of the housing will be divided among all the apartment owners proportionately.

Chapter 6 Section 23 states that protection, repairs and maintenance of the building and collective area and facilities is the duty of the promotor. In case the promotor is to sell all his apartments owned or is

unable to perform his duties, Section 24 mentions that the duties under promoter is to fall under a committee formed among the apartment owners with everyone's consent. The promoter is liable to raise charges and fees for his duty as fixed in agreement according to Section 25.

Competent authority can issue directives to promoter or the committee which must be complied with according to Chapter 7, section 33. The government of Nepal may make rules for carrying out the objectives of this Act as stated in Section 35.

The Act does not cover any provisions for housing colonies where the owner buys a particular piece of land and an individual house. The definition of "joint housing" under the Ownership of Joint Housing Act only mention about the apartments and the rights and duties of an apartment owner, its promoter and the committee formed by a unanimous decision of the owners. An apartment complex is a building or a cluster of buildings with common collective spaces, and facilities. These spaces and facilities are shared by the apartment owners collectively and equally. The Act does not allow use of collective space for any private purpose. It does not allow the demarcation and prohibition of land. The apartment owners do not own parcels of land within the complex privately. They get a share of the land only in case of complete destruction of the apartment buildings. This is not the case for group housing colonies. In a housing colony, each house owner owns their parcel of land separately. There are roads providing access to each land or house. These houses do not conform with the definition of joint housing or apartment explicitly mentioned in the act. The only common spaces in these gated housing colonies are roads and small community spaces. So, the act does not particularly cater for gated housing colonies.

4. Study Area Overview

Bhaisipati is growing as a posh, luxurious residential settlement. It is a part of Lalitpur Metropolitan city. Lies in the southern outskirts of the city outside the ring road. With such development comes land use change, demand for infrastructure, rise in the number of people using facilities and services. Various communities (gated or otherwise) is emerging in this location. Some gated communities reflect the growing range of choices available to consumers in the postmodern city. The affluent can move to gated

enclaves in search of privacy and exclusivity, and in flight from fear, closing themselves off from the dangers outside.[10]

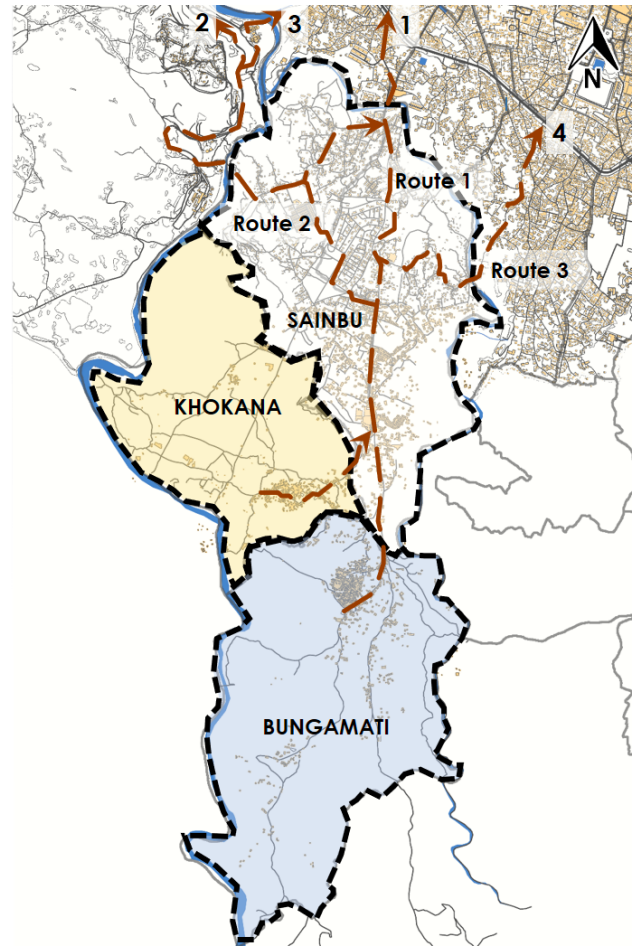


Figure 2: Routes to the City

It being in the outskirts of the city many people residing there have jobs in the city and commute to and from the city every day. Although there are 3 routes (Figure 2), most of Sainbu, Khokana and Bungamati area has only one primary access to and from the city, i.e. via. Nakkhu road (Route 1). Among the other routes, Route 2 (Figure 2) goes through Vinayak Colony and is restricted for non-residents of the community This route can access Chobhar, Balkhu and Dhobighat areas. Route 3(Figure 2), which links to Mahalaxmasthan is long, narrow, rough gravels and rarely used. Thus, traffic count of Route 1 is conducted for the study purpose.

The junction where Nakkhu-Bhaisipati road and Nakkhu-Chobhar road meet is quite narrow. This paired with the fact that it is the only route causes a lot of congestion during rush hour.

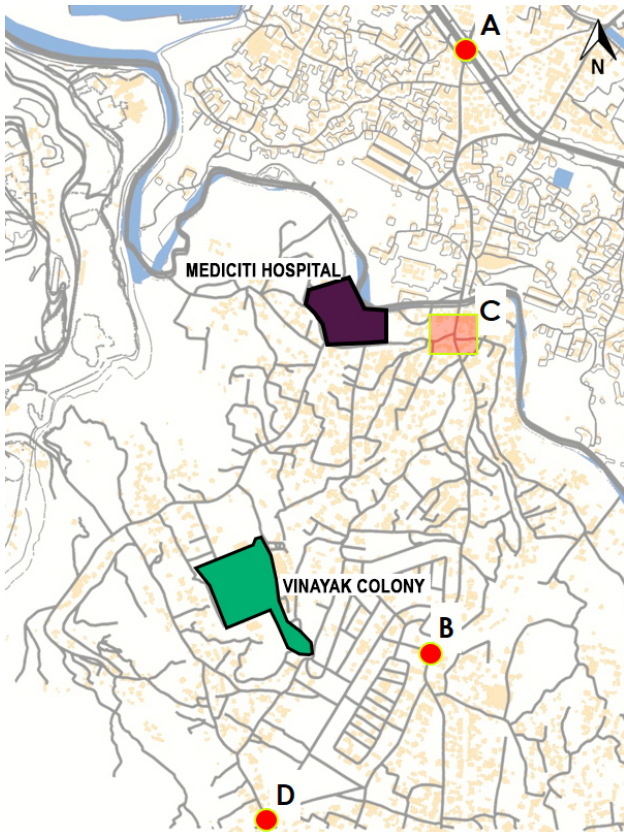


Figure 3: Context of Study Area

In Figure 3, Point 'A' is the Ekantakuna junction at ringroad. Point 'B' is the entrance of Bhaishipati as to the south of Vinayak colony. Point C is the bottle neck junction. Traffic count is taken of this junction of number of vehicles going in different direction. Point 'D' is the Magar gaun junction.

The distance between A and B is 1.8 Kms. This stretch of road, i.e. A-B is the most frequently used as most people living in Bhaishipati, Sainbu, or even Bungamati have to commute via this road to access the city.

Rush hour time sees a lot of traffic jam at junction 'C' thus time taken to travel from point A to B and vice versa was recorded during rush hour on week days and an average was taken. The time taken to travel the same distance on weekends or holidays was also taken to gauge the difference in travel times.

As the junction sees a lot of congestion average stopping time and the average number of times a vehicle has to stop to cross the junction while travelling from A to B or vice versa was recorded and average time lost is calculated.

Then as a hypothesis, the time taken to travel from point B to Point A via Vinayak colony, assuming there is little to no congestion in junction 'C' based on the

distance and base average speed is calculated.

After all this data and assumptions are compiled, interpreted and based on the policy review and the interpretations, discussions and possible solutions or measures to be taken is suggested.

5. Data and Analysis

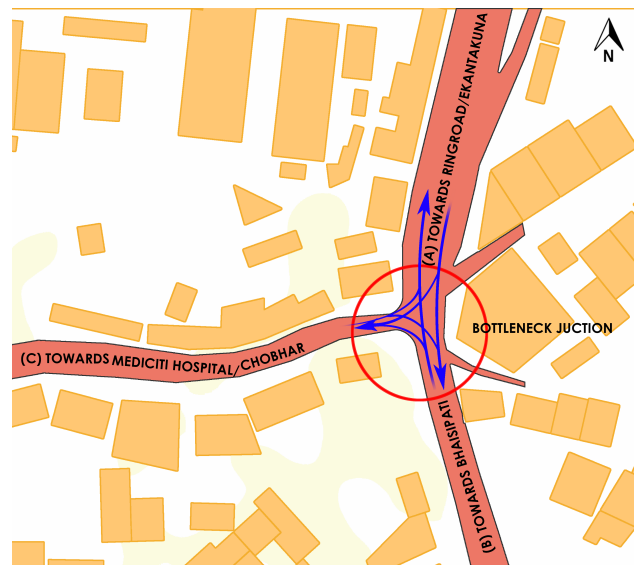


Figure 4: Bottle neck Junction

Figure 4 of the bottle neck Junction 'C' shows that the junction has 3 main roads connecting to it. From 'A' Ekantakuna, from 'B' Bhaishipati and from 'C' Mediciti / Chobhar. Here there is a lot of cross flowing traffic as vehicles move from all three sides to all three sides. This makes traffic management a compulsion.

Number of vehicles travelling from A to B, A to C, B to A, B to C, C to A and C to B is recorded and calculated. Traffic count on this junction is done for 3 days during rush hour traffic in the morning and evenings.

Two wheelers, small vehicles (3 or 4 wheelers) and heavy vehicles are counted. Other miscellaneous vehicles such as tractors or rickshaws are included as well.

The data so collected is presented in a bar graph in Figure 5 and Figure 6

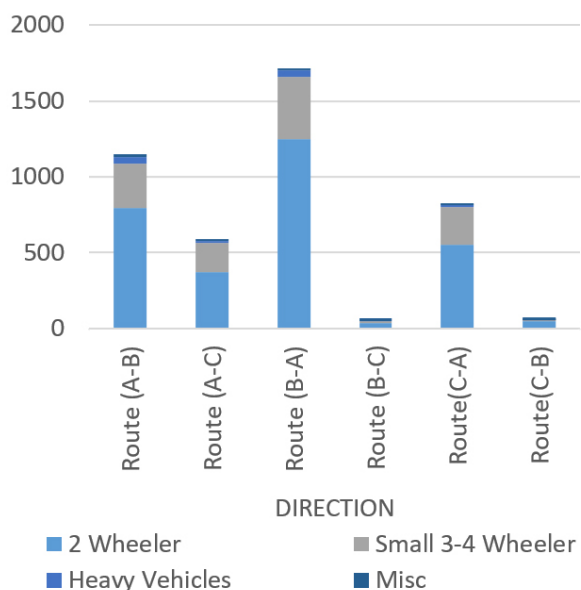


Figure 5: Traffic Count at Bottleneck Junction (Morning 9:30 AM - 10:30AM)

Figure 5 shows the morning traffic count. The highest number of vehicle is the two wheeler at this time of the day. An average of 3060 two wheelers cross this junction on a daily basis as per the data recorded. While small vehicles are seen to pass this junction on an average of 1157 in numbers while heavy vehicles and other vehicles are seen less than 130 in number. On an average 4342 vehicles pass this junction in an hour during the morning rushhour traffic. Further, it can be seen that majority of the commute is from point A - B and from point B - A. An average of 1133 vehicles from A to B and 1704 vehicles from B to A. This shows that most of the vehicles are traveling either from Ekantakuna towards Bhaisipati or from Bhaisipati to Ekantakuna. The data shows that commute between Bhaisipati and Mediciti is minimum at this time of the day.

Figure 6 shows the traffic count of the evening. The highest number of vehicle is the two wheeler at this time of the day. An average of 3080 two wheelers cross this junction on a daily basis as per the data recorded. While small vehicles are seen to pass this junction on an average of 1141 in numbers while heavy vehicles and other vehicles are seen less than 150 in number. On an average 4360 vehicles pass this junction in an hour during rush hour traffic. Further, it can be seen that majority of the commute is from point A - B and from point B - A. An average of 1558 vehicles from A to B and 1307 from B to A. This shows that most of the vehicles are traveling either from Ekantakuna

towards Bhaisipati or from Bhaisipati to Ekantakuna. The data shows that commute between Bhaisipati and Mediciti is minimum at this time of the day.

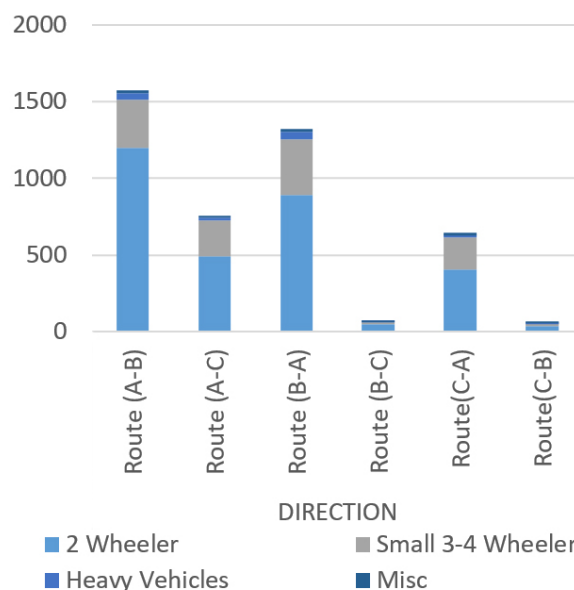


Figure 6: Traffic Count at Bottleneck Junction (Evening 4:30 PM - 5:30 PM)

Time taken for a vehicle to travel from point A to B and B to A is recorded. These recordings are taken in different times of the day on different days. This includes normal work day during the rush hour traffic time when there is a lot of vehicles, normal work day in the time when there is no rush hour traffic and on a holiday when there is minimum traffic. This helps in the understanding of extent of delay which directly correlates to the accessibility and mobility in the area. The average time taken on various scenarios is calculated and tabulated in Table 1

From Table1, the following observations can be made. During holidays on an average it takes 3:42 minutes to travel the distance of 1.8 Kms via 'Route 1' (Figure 7) from point A to B and 3:34 from point B to A. This indicates than an average speed of around 30 Kmph is achieved. On working days during non-rush hour times, when there is moderate traffic, the travel time for moving from A to B increases by 1.36 times and from B to A increases by 1.61 times. On working days during rush hour time, with maximum vehicles, the travel time is significantly increased when moving from B to A as a vehicle typically has to stop for 2.5 times for an average total of 3:27 minutes. Here the travel time from B to A is increased by 3.76 times the normal travel with minimum traffic. The travel time

for moving from A to B increases by 1.89 as it does not require stopping at the junction.

S.N	Direction		
	Work Day (Rushhour Traffic)	Work Day (Normal Traffic)	Holiday (Minimum Traffic)
Time Taken From A-B			
1	6:41	5:12	3:46
2	6:48	4:53	3:41
3	6:51	5:03	3:39
Avg.	6:46	5:02	3:42
Time Taken From B-A			
1	11:23	5:26	3:33
2	12:59	6:04	3:39
3	14:32	5:48	3:32
Avg.	12:58	5:46	3:34

Table 1: Time taken to travel between A and B

If a vehicle were to travel through 'Route 2' (Figure 7) of 2.6 Kms distance, taking an average speed of 30 Kmph, the time to travel from point B to A via route 2, i.e. through Vinayak colony is 5:12 minutes. Which is still faster than sitting though congestion and traffic of the bottleneck junction.

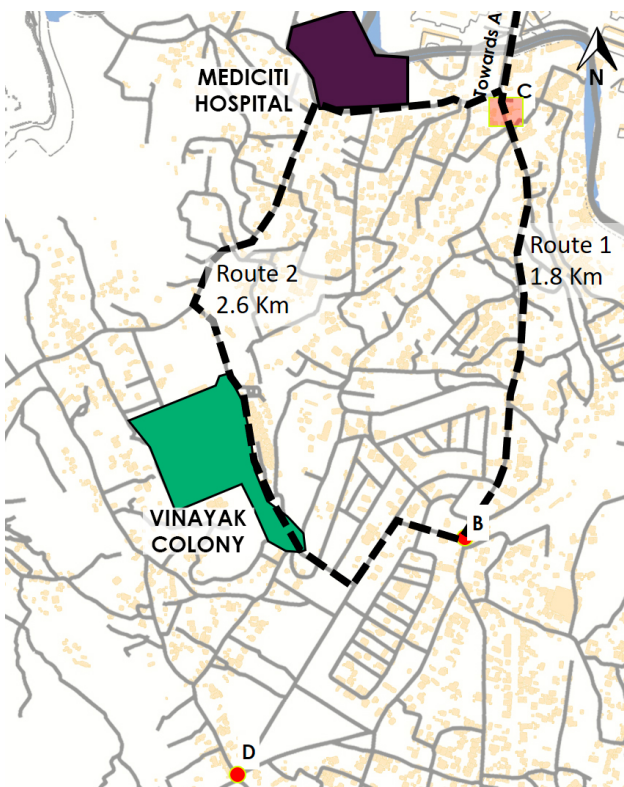


Figure 7: Route Options from point B to A

6. Discussion

The settlement of Bhaisipati is growing rapidly. The growth rate of Sainbu observed from 2001 to 2011 is 14.5% (Figure 8). If the population increases at the same rate, it will reach up to 3.6 lakhs by 2031 (Figure 8) making the density of Sainbu 87,520 people per Sq.Km.

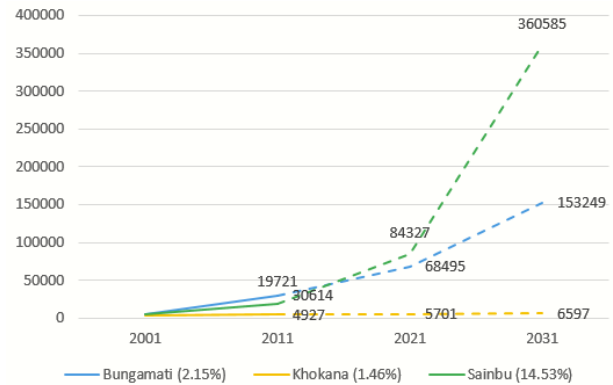


Figure 8: Population Projection for Bungamati, Khokana and Sainbu individually as per current Growth Rate

As Sainbu faces congestion the growth will move further south towards Bungamati and Khokana where the growth rate is comparatively less at 2.15% and 1.46% respectively [11, 12].

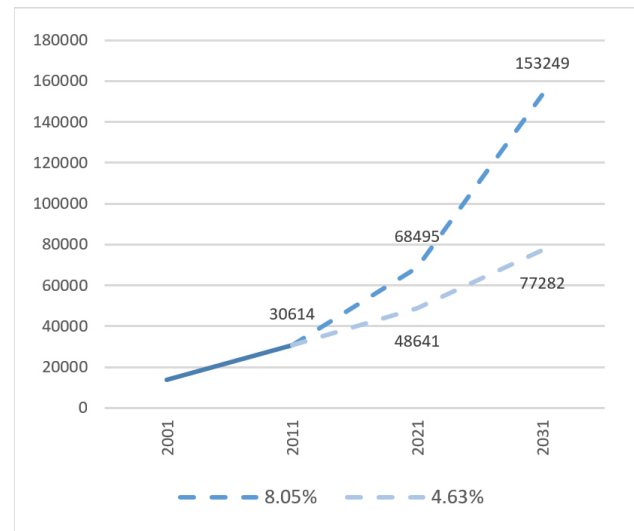


Figure 9: Population Projection for Bungamati, Khokana and Sainbu Area as a Whole

Growth rate of Sainbu, Bungamati and Khokana area 8.05% when the growth of Lalitpur is only 4.63% [12]. Assuming the growth at the rate of 8.05%, the population in this zone reaches to 1.5 lakhs by 2031.

Impact of Gated Communities on Local Mobility

As the settlement in Bhaishapati continues to grow, more vehicles will run on the road. In Bagmati zone alone there was an addition of more than 1 lakh vehicles in fiscal year 74/75 (Figure 10).

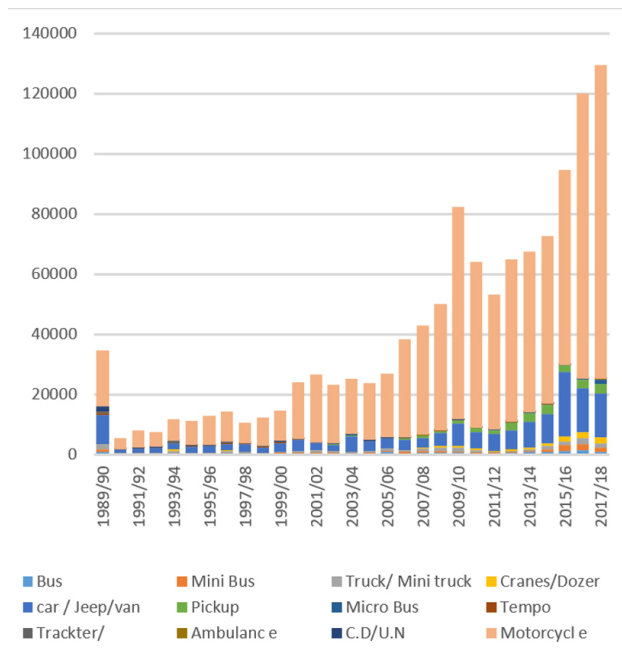


Figure 10: Number of registered vehicles in Bagmati Zone from Fiscal Year 46/47 to 74/75[13]

According to SSP Panta, the majority of the vehicles registered in Bagmati zone ply in Kathmandu valley. Furthermore, JICA has predicted increase in ownership of cars by 2.4 times and bikes by 1.72 times in the valley.[14] However, the increase in vehicles in Bhaishapati could be more than predicted increase in the valley. According to different city models: Burgess’s concentric ring model, Hoyt’s sector model and Harris and Ullman’s multiple nuclei model, the population with a higher economic status tend to move towards the outskirts and suburbs for a better, quieter life as this group can afford to commute to the Central Business District(CBD), in their personal vehicles, on a daily basis. These theories can be observed in the Sainbu-Bhaishapati area as well. Bhaishapati has been targeted as a prime location for luxurious living by many group housing companies. Thus, the number of vehicles in Bhaishapati will be higher than projection for the entire valley.

With only one major access road connecting the area to the main city, this road will see a lot of vehicles. The junction at Nakkhu is a bottleneck spot and is the main area for traffic jam due to the long wait time while passing through or crossing said junction. We can see

the travel time increase by about 3.6 times during rush hour. The area is still in the process of development and densification. If gated communities with an option for thorough fare allow vehicles to pass, an alternate route is provided. This will ease traffic congestion and reduce travel time.

The Ownership of Joint Housing Act defines and describes “joint housing” in terms of apartments. Here, joint housing is defined as a building or group of buildings with multiple floors with different apartment units where two or more families can live in a single building. The building or a cluster of buildings can be within one parcel of land with the open spaces as common collective spaces. The Act does not allow use of these collective space for any private use or demarcation and prohibition of land. The act gives power to the promoters or elected committee of the apartment owners to maintain, protect and repair the collective spaces. However, the apartment owners do not own parcels of land within the complex privately. They get a share of the land only in case of complete destruction of the apartment buildings. In a housing colony, each resident is a land owner and owns their parcel of land separately. There are roads providing access to each land or house. These houses do not conform with the definition of joint housing or apartment explicitly mentioned in the act.

The Public Road Act defines “public road” as roads that is not privately owned. So any road providing access to more than one parcel of land or more than one landowner is considered public road. According to this, the roads in the housing colonies appear to be “public roads”. This act prohibits any individual or group from causing any obstruction of movement on these public roads in any way. It also prohibits anyone from performing any act as to barricade, obstruct or damage the area within the road border without permission from the Department of Roads or the local authorities.

The Lands Act describes provisions and prohibitions of ownership of land to any individual, committee, institute or cooperative. It states that anybody, be it individual or group is not allowed to own more than 25 ropani of land in Kathmandu valley. It mentions that the individual or group is allowed to own 5 ropani more for housing purposes. It provides exceptions to institutes and other groups to own more land by special permission on the pretext that the 25 ropani is not sufficient for the group or individual to run their operations.

Housing colonies are much larger than 25 ropani and thus cannot be owned by the committee. The ownership of joint housing act does not cover the housing colony specifically. Thus, power cannot be given to the committee to control common areas as the common areas in housing colonies are “public roads” as per the public roads act, as opposed to the parks, utility spaces, basements in apartment complexes.

So, from a legal stand point, the gates in the boundaries of housing colonies does not appear to be legal. Thus, if ordered by the Department of Roads or by the local authority, the gate restricting movement shall be removed.

7. Conclusion

The study shows that restricting access in a growing settlement can cause congestion and elongate travel time. Longer travel times means lesser accessibility and mobility. Gated communities with the ability for thoroughfare limit access and contributes to congestion.

Looking at the legal standpoint, there can be seen a gap in the availability of specific laws and regulations regarding gated communities. While there is explicit laws for apartment complexes, on the rights, duties, allowances and prohibitions. The law does not have a provision to allow housing colonies to place a gate and restrict access to the area.

Installing a gate and privatizing these roads means the residents usually take responsibility of protection and maintenance of the areas within the boundaries and the local body does not interfere.

Access should be granted to the public in locations where there needs a thoroughfare and ease congestion. All areas in the process of developing and densification needs adequate roads to access such areas. Strategic planning to provide adequate and accessible roadways is important.

Adequate and relevant laws on the rights, provisions and prohibitions that gated communities, their residents and committee should abide by needs to be formulated. The competent authority should formulate and regulate proper process of approval to own, construct, sell and run these communities. These

policies, regulations and process need to be made clear and readily available.

Thus, accessible roadways should be maximized as far as possible. This shall include opening gated communities or requiring gated communities to provide an accessible road across the enclosed area where necessary. Adequate laws regulating housing colonies and the requirement of access should be formulated. Planning policy and development guidelines should include the need for accessible and inclusive development.

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