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Strategizing the Future Transport Infrastructure for Cities of Organic Significance to Conceptualize an Efficient Mass Transit System (Case of Abbottabad)

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Abstract: **While critically studying scenic paradigms, the cities of organic significance with natural topogra phical terrain in present situational perspectives, population density, vehicular and motorized traffic scenarios. Amazingly growing surprising sprawls very successfully trying to enchant the green covered hilly topographic landscapes with concrete masses of residences and townships The anomaly and catastrophe referring to the proper land use allocation for the existing areas within cities of natural landforms, and the dogmatic mannerism of the public towards not responding sensitively to this pertaining issue often inflames the existing mushroom growth and uncontrollable sprawl within cities. Commercial jungle ferociously encroaching over the residential peripheries hovers over the main arteries of city such as Main highways and other peripheral secondary and tertiary routes since years. In addition to the serious violation of right of ways allocated for natural drains and sewers facilitating the normal public to be land grabbers of public property This issue would erupt enormously to the level making the rainwater drains blocked. This would facilitate the water to intrude into the residences and other public property such as main transit routes and secondary and tertiary roads. In addition to the international level megacities and that of Pakistan, even small towns are seriously affected, and its severity is evident through observing rapid, uncontrolled mushroom growth processes through inevitable urbanization. This in turn portrays its implications through catastrophically increasing motorization and problematic vehicular transportations passing through small towns and cities. The study focuses on what would be suggested solutions for the prevailing issue of alarming vehicular transit flux through a very small town as Abbottabad, which has Karakorum Highway (KKH) or Mansehra road as the only artery which is catering the load of both intercity and intra city diversified traffic burden through decades? A mass transit system, BRT (bus rapid transit), train transit or some indigenously generated solution such as tram systems, cable car systems. Very importantly how this transportation solution would impact the Architectural building skyline of the city. This is the need of the day and which may prove itself to be a sustainable and long term visionary objective based problem solving mechanism, a challenging attribute with respect to socio economic need, climatological tectonics, architectural character enhancing machinery and toolkit for the city like Abbottabad.**

Keywords: **Architectural character, Organic significance, urban design strategies, transport scape, city skyline, urban landscape, Mass transit system.**

I. INTRODUCTION

Urban growth procedures may be termed as dual faceted due to their simultaneous development in horizontal as well as vertical direction.

The important, however, is the evolutionary pattern of arterial connections which programmatically derived the flow within the cityscape and in turn formulate the urban form in z axis. Therefore, decisions pertinent to the control and flow of traffic flux through urban road network systems act as driving force for generating cities geometry and design aesthetics.

A traditional approach towards urban transport system's analytical study focuses on the concepts of efficiency in terms of user friendliness, technological advancement and eco friendliness. But it does not portray the whole image of a city's circulation pattern and its impacts. There is a huge void yet to be filled by such systematic procedures of study which may very clearly lead towards understanding the urban scape as a three dimensional system. *(O' Flaherty, 1997).* Hence, urban infrastructure systems like transport scape can never be conceptualized in seclusion. Because of its nature being a part of horizontal growth system, it should be evolved from the overall master plan of the city, should be treated as an important triggering factor re-shaping the city's master plan, and last but not the least, it must be conceptualized with great sensitivity due to its highly responsive role to the city's skyline. *(Holmes, 2003)*

On the other hand, growth process of city's physical fabric and adjunctive infrastructural utilities should be in close proximity and response to the overall transport scape of the urban environment. A profound understanding of the dynamics of inter and intra city transportation as an amalgam of urban setting may present itself as a handy tool in avoiding haphazardly idealized short term developmental projects, such as flyovers, underpasses, unnecessary road widening procedures. In the context of developing world these kinds of projects usually only satisfy political will and vested interests of few individuals rather than focusing on the long term strategic benefit of the city's urban domain. *(UNSD, 1997)*

The city skyline being an important component of urban visual aesthetic should be a primary focus of urban beautification efforts/projects. Thoughtful efforts in this regard help multiplying the city skyline with natural landscape enhancing the urban settings. An urban landscape is far more than planting trees and providing green spaces especially in case of cities with surreal organic-nature setting as built-in feature of their growth and development sequence. In such contexts, seemingly a very small scale intervention may culminate in either enhancement or degradation of entire urban skyline, architectural vocabulary and the overall visual aesthetic of the city. Cities like Abbottabad with highly sensitive organic character, having a huge influx of tourists and in-migrants, encountering severe circulatory challenges need extremely careful amalgamation of inter as well as intra-city traffic plans which may in turn enhance the overall urban skyline. *(O' Flaherty, 1997)*

The study focuses on the scenario where the urban design systems are conceptualized as physical fabric which encapsulates engineering, technical and spatial planning procedures, aesthetic considerations, efficient transportation systems and traffic management solutions. But there is an intense need for devising and conceptualizing a proper mechanism which shall encapsulate urban system as a whole integral in such a way that every entity of urban setup shall be highly reflexive and in close proximity to the context of an overall urban design strategy of that city scape in specific the organically driven cities which are having immense natural landscape as part of the context and even more important is how the building skyline and transportation infrastructure would respond to this system.

Statement of the problem:

A scientific and integrated framework for context responsive transport system for cities of organic significance is needed

The objectives of the study:

To conceptualize an integral mechanism idealizing contextual responsive paradigm of transport scape for organically signified urban setups.

Significance of the study:

This research investigation would be an attempt to contribute as a guideline for urban planners and designers and would act as a stimulant for the prospective researchers as well as students by opening new vista for research and development perspectives. It would prove itself to be a revolutionary paradigm in formulating an amalgam for architecture, urban planning and urban design attributes at a broader and strategic level.

The study would help modify and culminate the concept of integrated strategic traffic and transportation management plans and its implementation mechanisms. With slight development and modification this would help providing broader guidelines for enhancement of local area development plans for cities and urban scape, of similar nature all over the globe.

Research Hypothesis:

Traffic management plans have significant impact on the building skyline. Following hypothesis of difference was established for this study.

The research questions:

1) What can be an approach towards formulation of mechanism which shall integrate urban scape systems, its infrastructural attributes, physical fabric and building skyline and natural landscape of city?

2) What is a context responsive transport infrastructure system for organically signified urban setup? How it can be an approach towards redefining the concept of efficient transport system? (Moughtin, etal. 1999)

Assumptions/Delimitations of the study

The building skyline is in conjunction to the contextual responsive nature of the city, and the infrastructural utilities are aligned with the building bylaws and regulations in urban setup of Abbottabad city. The traffic plans are developed and managed in accordance to the nature of transport scape within the city.

Transportation modes of inter and intra city which is focused on vehicular, motorbikes and cycling traffic systems. The building skyline means harmonized sequential system with reference to the heights of buildings and the architectural vocabulary evident on the building facades, which depicts the face of cityscape for a city.

Research Design:

Identification of research problem would be the first step towards formulating the research study. Clarity of the objectives, stating the hypothesis and development of the research questions is a vital part of research design. Significant theoretical framework would be established for understanding and acknowledging existing research on the topics of relevant nature or in close proximity to the research objective. Case study analysis of the international significance would be conducted to build up the inspirational content of the study. The data collection would be both primary and secondary data sets which will be collected utilizing the qualitative data collection and quantitative data collection techniques. Analysis and presentation of the data collected would be compiled, discussed and inferred which would lead our path towards formulating conclusions and recommendation to our study and ultimately help in devising stepwise procedure towards conceptualizing a framework for contextual responsive transport scape for cities of organic significance**.**

II. UNDERSTANDING URBAN SPRAWL AND URBAN GROWTH

- Urban growth is a well thought, planned and controlled process of city expansion whereby economic and ecological improvements are achieved
- Urban sprawl, on the other hand, is an unplanned and uncontrolled process, resulting in economic, social, and environmental degradation of the community (Bekele 2005)

CAUSES OF URBAN SPRAWL

- Population growth
- Rise in household income
- Subsidization of infrastructure investments like roads
- Ineffective land-use excessive growth
- Social problems in central cities
- Poor land policies (Bekele 2005, p. 1)

STUDYING THE CONCEPT OF SMART GROWTH:

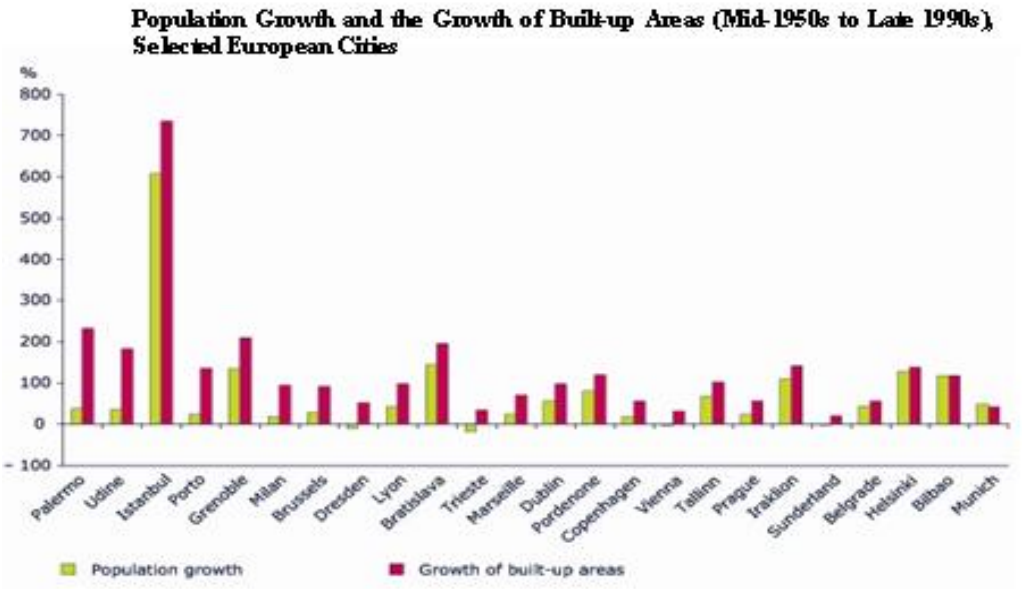
- Idea of smart growth is concerned with the effective urban land management and
- “channels development to areas with existing infrastructure” and
- “consumes less land for roads, houses, and commercial buildings” (Bekele 2005, p. 17)

FOCUS OF SMART GROWTH

- The idea of smart growth stresses on:
- Limiting outward expansion

- Encouraging higher density development
- Encouraging mixed-use zoning
- Reducing travel by private vehicles
- Re-vitalizing older areas, and
- Preserving open spaces (Gillham 2002):

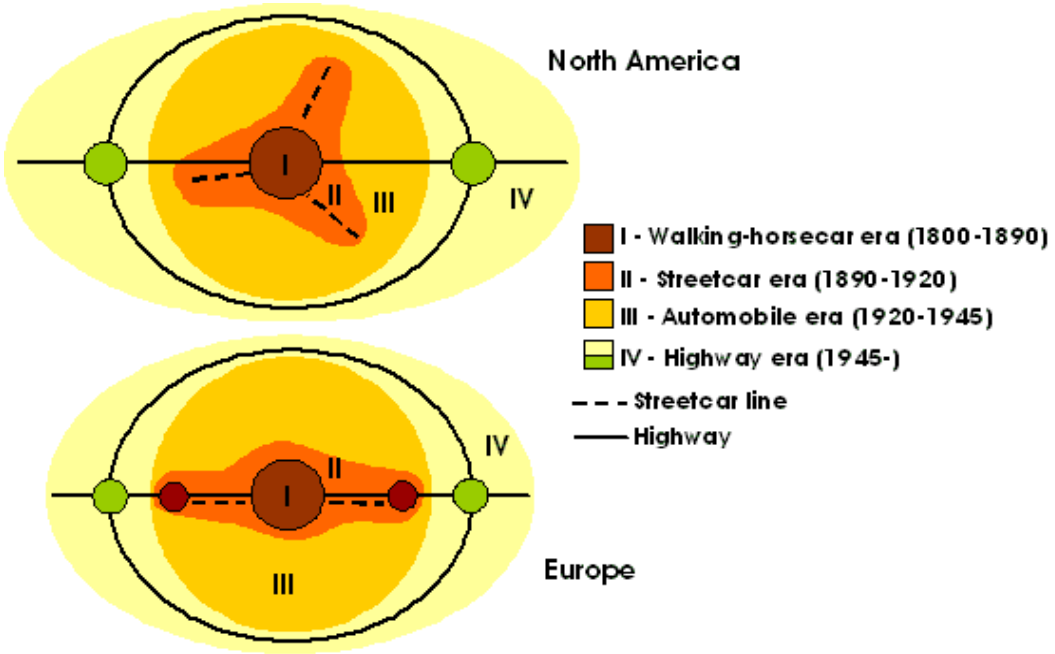
III. URBAN SPRAWL ANALYSIS OF DIFFERENT PARTS OF THE WORLD



Source: European Environmental Agency (2006, p. 8)

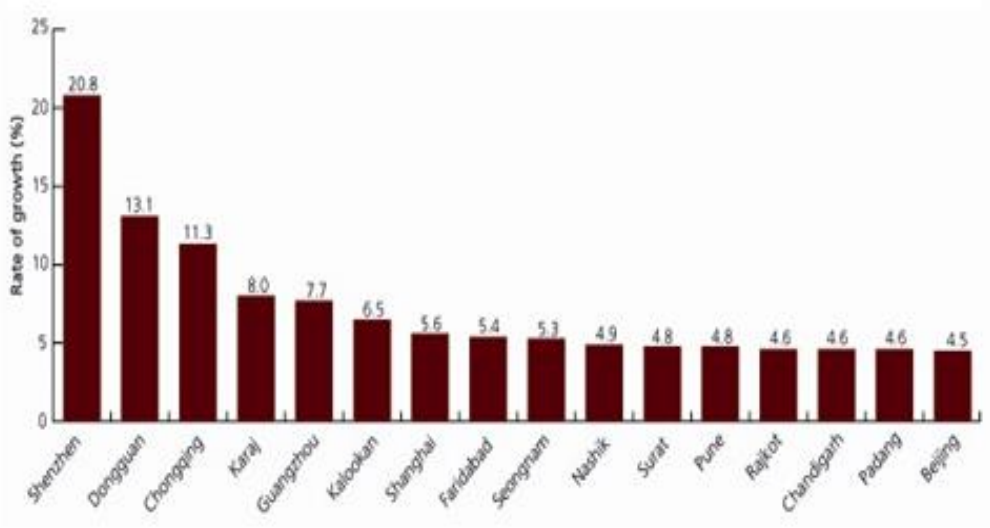
Figure 1

The Effect of Evolving Transportation Technologies on City Form:



Source:Arbury (2005), p. 22

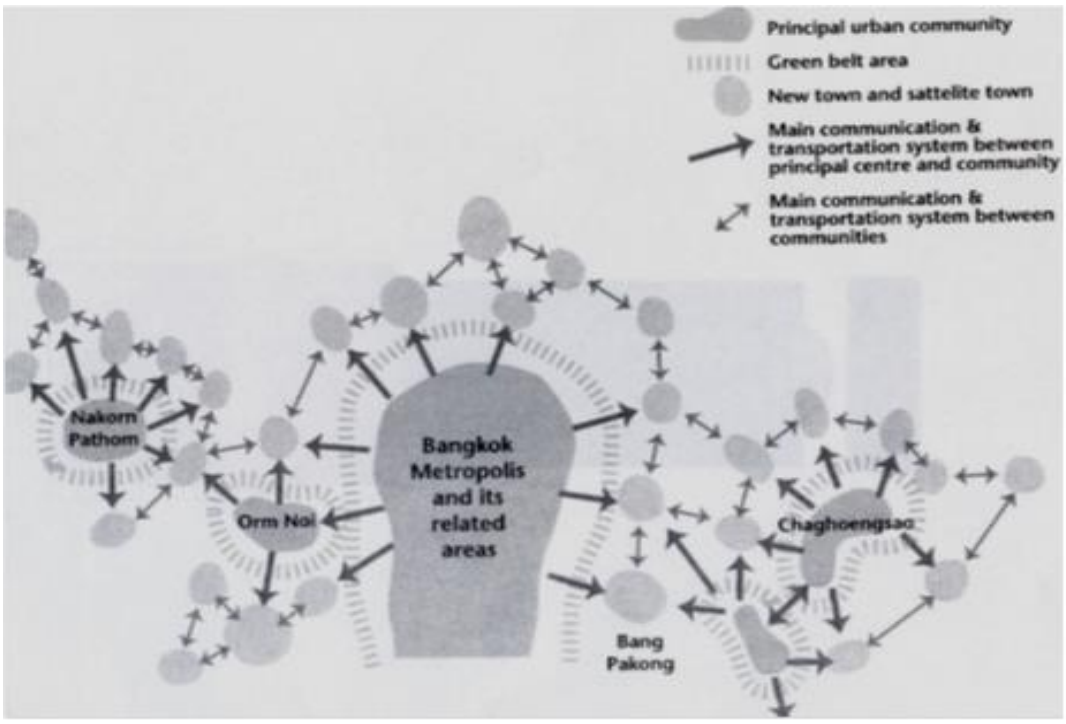
Figure 2: Average Annual Growth Rate of Selected Fast Growing Cities in Asia between 1990 and 2006



Source: UN-HABITAT 2010

Figure 3

Un-controlled Urban Sprawl in the Bangkok-centered Region:



Source: http://www.un.org/esa/population/meetings/EGM_PopDist/Laquian.pdf

Figure 4

URBAN SPAWL IN PAKISTAN

- People have been moving from the rural areas towards mega cities of the country in search of jobs and better living standards
- This movement has posed not only physical problems to the structure of urban settlements, but also resulted in the administrative disputes among various authorities.
- "Contiguous built up areas of towns have extended into that of a rival rural Union Council. The Union Council is unwilling to surrender its territory and allow extension of the boundaries of the municipality, leading to many problems such as waste disposal in the built-up area"

Urbanization Trends, Size and Growth of Urban and Rural Population

Level (World/ Continent/ Country)	Level of Urbanization (%)			Urban Population					Rural Population				
				Estimates and Projections (000)			Annual Growth Rate (%)		Estimates and Projections (000)			Annual Growth Rate (%)	
	2000	2010	2020	2000	2010	2020	2000-2010	2010-2020	2000	2010	2020	2000-2010	2010-2020
World	47.2	51.5	55.9	2,861,756	3,513,700	4,236,927	2.05	1.87	3,194,959	3,312,036	3,342,351	0.36	0.09
Asia	37.5	43	48.7	1,375,519	1,783,600	2,231,108	2.6	2.24	2,296,822	2,361,337	2,350,476	0.28	-0.05
Pakistan	33.1	36.9	42.4	46,757	66,966	96,534	3.59	3.66	94,499	114,418	131,247	1.91	1.37

Source: UN-HABITAT 2003 pp. 252-253

Figure 5: Urbanization Trends, Size, Growth of Urban and rural population

IV. AN OVERVIEW OF ABBOTTABAD

- Abbottabad is one of the cantonment towns in Pakistan which was designed exclusively for administrative and strategic purposes.
- Comprising of a narrow valley having only one major transportation route running in approximately north-south direction.
- The city underwent a ribbon sprawl during the course of its expansion
- Later on engulfed certain villages situated at its periphery.
- During the course of its growth however, the city has seen considerable expansion and added commercial, educational and residential land uses.
- The growth has been particularly rapid since the earthquake of 2005, after which a large number of people affected by earthquake in the mountainous areas of Hazara migrated to Abbottabad.

ABBOTTABAD AS AN URBANSTUDY

- major problems & issues encountered by Abbottabad city's urban scape
- traffic and transportation systems
- inter-city traffic and row
- parking facilities in parallel to highways and within city downtown centers
- intra-city secondary and tertiary route definitions and its management
- quality housing and its alarming growth
- evolution of slums and squatter settlements
- mushroom growth in commercial sector
- architectural character and skyline

V. SOLUTIONS TO THESE URBAN SITUATIONS

- standardized land use plans defining zone wise positioning of diverse building typologies
- structure plan for devising the strategies of urban and architecture designing of Abbottabad city for next 50 years (it needs constant monitoring and evaluation every 15 years)
- consolidated master plan defining the city's development for next 15 years (it needs constant monitoring and evaluation every 5 years)
- traffic and transportation strategic and management plans
- water supply and sanitation system plans

Solution finding Approach for Urban Sprawl and Mushroom growth of Abbottabad:

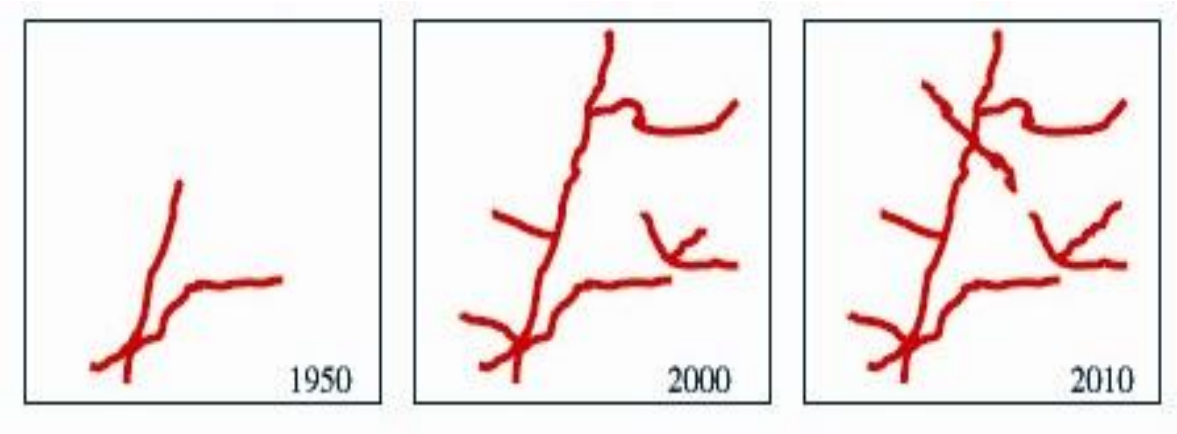


Figure 6: The growth pattern of Abbottabad since 1950

Analysis Investigations & Solution finding Strategies:

Figure 7: analysis of transit variety options all over the world in contextual similarity to Abbottabad city

Source: https://www.google.com.pk/search?q=curitiba+bus+system&tbm=isch&tbo=u&source=univ&sa=X&ei=1_chU-6-K6m2yAGKp4DgBg&sqi=2&ved=0CCQQsAQ&biw=1280&bih=699

VI. CONCLUSION

While considering special case of Abbottabad city, the recommendations would be primarily culminating short term strategy and long term strategy for catering the catastrophic dilemma of transportation system within the city. In the first instant I would suggest the redefinition of the existing KKH road, The right of ways shall be respected, the illegal encroachments shall be removed, following the NHA (National Highway Authority) latest rules which says that this road which is catering both intra city vehicular transit and intercity flux inclusive of diversified traffic flux ranging from trucks and buses to private vehicular traffic, it shall be widened 65 feet from the central median.

After this stage a proper standardized transport management plan shall be designed this can include opportunities for both intra city and intercity traffic fluxes. In the central area a corridor shall be created, with the options of tram systems, cable car system or an efficient BRT (Bus Rapid Transit) system. This will be a strategically sustainable option for intra city traffic flow. Adjacent to this both ways freeways shall be developed which will cater fast flowing inter city traffic system through Abbottabad city. At the far edges of this there shall be service roads for catering the maximum inflow and outflow intra city traffic. These service roads shall be connected to the opposite side edge corridor through efficiently

designed underpass systems and over heads. At some points and nodes (interchanges), to maintain the fast lanes of free ways of inter city transit flux proper underpasses shall be designed; this option would act to be very sustainable, cost efficient and long term beneficial as the undulating topographical character of the Abbottabad city roads would help the underpass to function more efficiently.

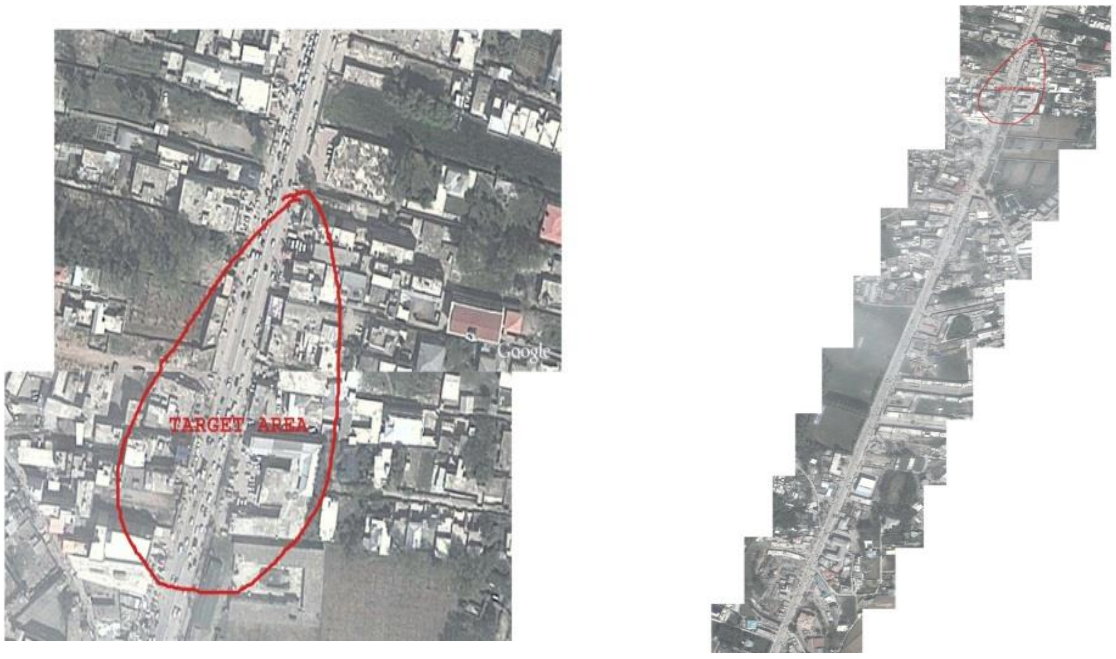
This was a short term option. For the long term strategy there must be an expressway which shall bypass Abbottabad city urban population and shall connect to the main Karakorum Highway going straight to the China's border. The express way is proposed to initiate from Burhan Interchange at Hassanabdal, shall move through Paniaan village passing outskirts and suburbs of Haripur and Havelian regions. Right at the back of Shimla Hills it shall move towards Mansehra city. Abbottabad shall have two primary interchanges for that expressway system. One at Shimla Hills, and the other at "Siaan da Katha", at the suburb of Abbottabad touching the Mansehra villages At the Mansehra city there shall be one interchange which would be primarily located in outskirts of Mansehra Suburbs. In this mannerism it shall connect to Main KKH going straight to China's border by passing the whole of Kaghan, Balakot and adjoining areas.

Expressway is inevitably of prime importance for Hazara region's transport system to work. But the most important aspect is that through the interchanges specifically for Abbottabad and Mansehra there shall be efficient Mass Transit systems which must be designed throughout the city considering the contextual responsive behavior of the city scape and sustainable factors of the system proposed. If that point of consideration is not addressed to the highest esteemed levels the survival of the transport infrastructure and road systems would be in ultimate danger and the city's fast growing urban character would start resulting in dooms paradise.

A very important point of concern is the Architectural vocabulary with reference to the urban fabric and hovering commercial based concrete encroachments which is turning the torsos of city's beautiful green character into concrete jungle of mushroom character. So to enchant this beautiful city's lost perspectives, the paradigm for redefining the building skyline of Abbottabad city specifically focusing on the commercial buildings Alien symphony at present time. Real translations of the old and original Architectural character of Abbottabad city shall be redefined, through redesigning the frontal facades and building elevations along the main KKH or Mansehra road catering the rejuvenation of real Architectural and urban character of the city.

This is exemplified in the form of a proposal, providing the strategy, procedural mechanism and framework optimization for the whole conceptual synergy.

SPECIAL CASE OF ABBOTTABAD CITY DEFINING STRATEGY FOR GREEN ABBOTTABAD:



(Source: www.earth.google.com/)

Figure 8: Existing KKH Mansehra road investigative studies

Fig 9: Proposal of redefining building skyline of existing KKH Mansehra road

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