DEVELOPMENT OF A REGIONAL TRANSPORT PLAN: 
CASE STUDY OF PROPOSED HORANA GROWTH CENTER

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ABSTRACT

The major objective of this paper is to set out the strategy of developing a regional transport plan 
that complies with other zoning and land use proposals. The Horana Growth Center (HGC) study 
has been used as a case study to illustrate this process.

The paper seeks to identify issues in transport with respect to capacity, level of service and the 
quality of transport such as – average speed, parking, roads and related service conditions etc. The 
strategies used in the development of a plan include long-term, medium-term and short-term in 
proposals in order to make the HGC a sustainable and growth-oriented center. The proposed new 
highways such as the Southern Highway, Outer Circular Highway, South-east Highway and a 
Radial Rapid Transit have been investigated for their long-term development impacts while road 
widening and improvements to existing road network, relocation of the wholesale market, a new 
bus terminal and introduction of a loop of bicycle lanes have been introduced as medium and 
short-term proposals. These proposals collectively represent a regional transport development 
plan for the HGC and for the larger hinterland.

The approach and methodology of the data collection and analysis have been presented in a 
manner that they can be used as a case study for future application in similar circumstances.

INTRODUCTION

The Horana Growth Center (HGC) is one of six growth centers identified in the 
Colombo Metropolitan Regional Structure Plan (CMRSP) prepared by the Urban 
Development Authority (UDA,1998). This paper arises from a study of the 
transport requirements for the development of the HGC (Kumarage et al, 2001).

The essential core of the CMRSP consists of bringing the entirety of the current 
Western Province of Sri Lanka as the Colombo Metropolitan Region (CMR) and 
developing a Core Area of the capital city and its immediate environs as well as 
establishing the 6 additional areas as Growth Centers. The HGC study area 
includes the entirety of Bandaragama Divisional Secretariat Division (DSD), and 
large part of the Horana DSD (eliminating around 27 of the 92 Grama Niladari 
Divisions (GND) situated in the North-Northeast of the DSD and the northern half 
of Madurawela DSD (Map 1).

OBJECTIVES

The major objectives of this paper are to propose a regional transport plan for the 
proposed HGC to be compatible with the proposed zoning and land use. This was 
undertaken as a case study, of a typical regional planning exercise in Sri Lanka,
which could be applied for similar circumstances in the CMRSP (or elsewhere in Sri Lanka) with the required modifications.

**APPROACH**

A fundamental premise in the development of a growth centers is that it should have comparatively advantageous transport linkages when compared to surrounding areas. Thus if Horana is to emerge as a growth center, transport provisions for accessing Horana have to be considerably more advantageous to any other alternative locations within the CMR. This would be one of the strongest and most natural means of attracting development into the areas planned as Growth Centers in the CMRSP. Secondly, it should provide for good regional linkages and connectivity to the hinterland of the proposed growth center. Only then will, a regional transport plan will act as an impetus of the overall development of the area.

**DATA COLLECTION**

The methods of data collection employed in the study to obtain traffic and transport details are briefly discussed below.

**Road Classification Survey and Road Use Maps**

The objective of this survey was the identification of all roads with significant amounts of traffic and their classification according to their present use and development potential together with future operational capacities.

**Origin-Destination Surveys (O-D Surveys)**

O-D surveys were made in order to determine the trip end characteristics of vehicle and passenger movements observed in the zone. These characteristics included the origin and destination zone of the particular trip, purpose of trip, nature of stops during the trip and the type of vehicle. This data was gathered by means of roadside interviews and bus-terminal interviews. The objective of these surveys is to build an O-D matrix that would illustrate the trip making matrix within and without the zone. This also included the formulation of zones within the study area and also outside.

**Traffic Volume Counts**

Screen line counts were made in order to determine the flow of vehicular traffic at several screen lines. Classified manual counts were also conducted to determine the composition of the vehicular flow at these locations within the study area. The objective of this exercise was to determine the present flow of traffic including both passenger and goods movements, differentiated by time of movement and vehicle used.
Travel Time Studies

Travel time studies were conducted at different periods of the day to identify the level of service available on various road sections of the existing road network. The study was done by using a test vehicle moving at a judged median speed at peak and non-peak periods.

Accident Study

Information on location and frequency of accidents was collected from the records maintained by the Police. Accident information gives a measure of the safety of the road network and is another criterion used to determine level of service.

Parking Study

The data on the nature of the demand for parking was obtained from the study in terms of: (1) an inventory of existing parking facilities – classified by on-street and off-street, (2) current demand patterns, (3) space occupancy, duration of parking and percentage overflow, and (4) the legal, financial and administrative factors.

Intersection Control Study

Data was also gathered on the capacity of road intersections to handle the traffic. Location, capacity and functional characteristics of each intersection and the traffic control devices available at that intersection was collected for this purpose.

Road Capacity Study

The data on road width, section length, pavement conditions, geometric design, vehicular composition of the traffic stream, drainage etc. were collected to determine the present and future traffic-carrying capacity of the roads.

Transit Studies

It was essential to understand the existing level of transit service and demand by carrying out studies such as passenger load data, passenger riding habits, operating data, trip transfer locations etc.

IDENTIFICATION OF TRANSPORT ISSUES AND FORMULATION OF BASIC STRATEGY

In a regional development plan, the transport plan should be sub-servient to the land use plan. In that sense it should support what the land use development plan tries to achieve. However, the transport plan must show if such plans are achievable. If not, land use plans may have to be modified to suit the transport sector limitations. On the other hand, certain transport sector proposals and
initiatives can provide catalysts for growth. In such circumstances, land use plans will need to be based on the transport capabilities.

Thus the development of a regional transport plan is typically an iterative process. It interacts intensely with the overall plan for land use. In the case of the HGC the proposed land use development plan (SWPEM, 2001) concentrated on four zones and their associated core activities as shown in Table 1. The four zones were selected in the study of the HGC on their potential for overall development (Map 1). Their specific development features are discussed below.

**Table 1: Proposed Land Use Pattern of Selected Core Activity Zones**

<table>
<thead>
<tr>
<th>Core Activity Area</th>
<th>Extent (ha)</th>
<th>Proposed Land Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Zone</td>
<td>450</td>
<td>IT based industries, Residential, Commercial, Public-amenities, Open space</td>
</tr>
<tr>
<td>Mixed Residential Zone (MRZ)</td>
<td>300</td>
<td>Residential, Recreational, Services &amp; Open space, Commercial, Public amenities, Industrial</td>
</tr>
<tr>
<td>Mixed Development Zone (MDZ)</td>
<td>800</td>
<td>Residential, Recreational, Services &amp; Open space, Commercial, Public amenities, Industrial</td>
</tr>
<tr>
<td>Horana Town</td>
<td>300</td>
<td>Commercial, Public amenities, Services, Residential</td>
</tr>
</tbody>
</table>

**Enterprise Zone**

An Enterprise Zone has been proposed in the HGC study to provide for skilled employment particularly for IT-based industries. Such a zone is dependent on good transport for two essential functions. On the one hand it needs to attract employment from distant locations and on the other hand provide good connectivity to business centers and the airport.

**Mixed Residential Zone**

The proximity to the Horana Town is beneficial for the development of this zone. As the zone is to be developed primarily for residential purpose, a well-planned hierarchical road network is needed to improve the accessibility and connectivity. The linkages of this zone with employment opportunities in Horana and Colombo need to be strengthened in particular. For this purpose, convenient access roads to (a) Southern Highway, (b) Horana Town and (c) the Enterprise Zone are desired.

But the traffic congestion on major roads will be at its highest near the Horana Town. However, its proximity to Horana town, makes it easier to attract people to
this zone. But the absence of a high capacity road similar to Kesbewa – Bandaragama road in the close proximity is seen as a drawback to commute to Colombo. However, the Horana–Padukka road offers an alternative linkage to High-level road, one of the main transport corridors leading to Colombo and other major town centers. The proposed SH is also located reasonably close to the MRZ. It is also directly accessible from the Colombo-Horana Road. These roads will combine to connect the residential zone with Colombo, which will make it attractive for those who wish to work in Colombo but live in a suburban center.

**Mixed Development Zone**

At present, this proposed zone is largely dependent on the already burdened Panadura-Ratnapura (A8) road for regional connectivity. This restricted accessibility puts it in an inferior position with respect to other two zones. As such, the development plan for this zone would heavily rely on the effective connectivity to the Southern Highway. A parallel service road along Southern Highway provides the most convenient access to SH from this zone. According to the current status of the SH design plan, there aren't any parallel service roads proposed. Therefore, the need for parallel service roads between Kahatuduwa and Raigama needs to be emphasized for the effective utilization of the SH for the development of this zone.

The local road network of the area will then be a distributed one spanning both north-south and east-west directions. These roads connect southern town centers such as Matugama and Kalutara, via the SH. It can also be connected to Bulathsinhala through Bellapitiya. Improvement of selected roads would strengthen the linkages between HGC and southern regions.

Therefore, direct buses route to Colombo from Bulathsinhala and Matugama through B5 or SH can significantly reduce the transfers at Horana and lower the travel times. These can be re-routed through the MDZ to the SH, thus easing the pressure on Horana Town.

**Horana Town**
One of the most noticeable features of Horana town is that almost all the developments of the town are along the main roads. All these roads are sub-standard two lane roads ranging in width between 4 - 5 meters. The absence of adequate facilities for pedestrians and vehicle parking has further contributed towards worsening the traffic congestion.

The absence of an orbital road network has further contributed to traffic problems in the town area. It has lowered the average traffic speeds within the town area, which vary between 10-20 km/hr. There are hardly any traffic management measures in the Horana town area except during the market activity days when there is some traffic movement restrictions. The traffic management of Horana town center is critical for it to perform the central activity of a growth zone.

In this respect roads are identified for widening, intersections for traffic control, locations for off-street parking, re-location of traffic generating activities that are ill-located such as the wholesale market. However, the land form of the Horana Town area provides only limited opportunities for easing all of the future traffic demands. A set of by-pass roads could be recommended in this context. However, connecting, as many zones without having to pass through Horana town will then be most advantageous. Or else the interaction between zones will also be constrained by the ease of traffic flow through Horana Town.

TRANSPORT STRATEGIES

Based on the salient features and issues identified in the previous section, the following strategies are made.

1. The interchange between the SH and the A8 should form the focal point of development in the study area.

2. The HGC should be planned so that the land-use development that is most dependent on mobility between different cities and regions should be located as close as possible to the interchange of the SH with the A8. The Enterprise Zone is ideally suited for this purpose.

3. Any plans or proposals that seek to locate new developments well away from the interchange and particularly those that are to be located to the west of Horana town, along the A8 highway would bring about a three-fold disadvantage to the concept of the HGC.

- If industrial location in the HGC were such that access time from the SH is high, such developments may very well be located at Matugama or even further along the SH, as the travel time on the SH may be less than accessing development areas on the existing roads.
• The second disadvantage is that if an industrial or residential zone is located away from the interchange with the SH, then the traffic moving to and from the interchange can have many negative impacts on the HGC.

• This in turn will have a further negative impact on the development of Horana UC area as a commercial zone. As traffic congestion, air pollution, parking problems are common place in all such zones in Sri Lanka. Horana would not be in a position to offer anything special in order to qualify as a growth center.

4. Map1 shows the potential employment catchment area for the Enterprise Zone. Generally it is taken that people would choose the place of employment if it were located within one and a half hours of travelling distance by public transport modes from their residences. The access and egress times to/from the public transport, frequency of service and the average travel times on the road network are considered in determining the threshold travel time contour. It is seen that the roads in the southern sector in particular are inadequate.

5. The area on either side of the Kesbewa-Pokunuwita (B5) Road to the north of the A8 appears most suitable for residential development. The topography, vegetation, and the availability of large tracts of land are all conducive for such a development project. Since most such residences would have trip patterns with Colombo and its suburbs, it would be logical to locate these residential areas in the northern periphery of the HGC. They showed however be connected to the SH and to Horana Town.

6. The second opportunity is created with respect to the land that would be opened up which is lying to the south of the A8. This too becomes accessible through the Wadduwa-Bandaragama-Kesbewa Road. A rectangle of land for development could be identified in this case too. But in this case, most parts may be low-lying and not suitable for industrial development. This may be more suitable for Eco tourism.

7. This would leave very little land close enough to the SH for purpose of industrial development. The areas in the north east quadrant of the study are, which is the land to the north of Horana and some locations to the south and south east of Horana are left for industrial development. However, industrial development especially for heavy industries that are more dependant on the movement of heavy containers to and from the port should not be located in this area, as they need to travel across the study area to access them from the SH. It should also be noted that the potential to attract employees is critical for the development of an industrial zone. Many industrial zones in Sri Lanka
are languishing for lack of workers. It has been pointed out in Kumarage (1999) that industrial workers would not be willing to travel more than one to one and half-hours from their places of permanent residence. Unless salaries are high, they would not wish to stay in temporary accommodation either. However, serving these areas from the SH would be difficult unless a new road is built by-passing Horana altogether.

8. In this respect, the proposed South Eastern Highway (SEH) appears to be the most suitable suggestion as it is presently to be located only to a maximum of two kms north of the study area and cutting across its north-east quadrant. This would open up direct access to the port and airport without travel through Horana. Furthermore, employment catchment would also be increased by travel on the SEH from areas such as Karawita and Nivitigala in Ratnapura district.

**STRATEGIC TIME FRAMES AND PROPOSALS**

Transport strategies for the HGC can be categorized under two time-frames; long and medium term and short-term strategies. This is defined with respect to the duration of their intended impact on regional development.

**Long-term Proposals**

**North-South Highway**

It should be noted that the six growth centres within the CMR are all located such that they are to be serviced by the proposed South Highway and its northwards extension (combined to be called the NSH) and are connected to each other from the Southern Province, at least as far south as Matara, and as far north as Negombo in the northern end of the CMR. This will be particularly useful to attract the scarce resources that are needed for the IT based industries. Thus the sustainability of the proposed IT-industry in the Enterprise Zone will rest heavily on the Southern Highway.

Horana and Bandaragama are two towns in the CMR that would have a significant impact due to the Southern Highway. If the OCH were not built immediately, then all traffic that wishes to use the Southern Highway would need to get to Bandaragama using one of the two access roads from the Colombo area. It is therefore most likely that this would slow down the speed of travel on the two main arteries to Horana: the Colombo–Piliyandala-Polgasowita Road (B5) as well as the Panadura–Horana-Ratnapura (A8) Road. Thus building the Southern Highway and not building the OCH will have a negative impact on the HGC.

**South East Highway**
This has been identified as a new road extending in the general southeast direction from the OCR at Kottawa. This proposal was subject to a pre-feasibility study in 1992 commissioned by the RDA. This was then known as a ‘Road Link to Ratnapura’. The CMRSP shows that this road should be part of a spinal network of limited access roads. Kumarage (1999) in his report on Transport Strategies for Poverty Alleviation make the further case that this road should extend beyond Ratnapura to Moneragala and Passara. This road will further strengthen the growth of the HGC, as it will then be at the apex of two radial highways from Colombo. Thus the employment attracting capability will increase as will the connectivity to Colombo Port and the airport.

Radial Rapid Transit

Apart from road transport there are other transport modes too that can be promoted to serve Horana. But opportunities for such are presently limited. The development of a radial rail line connecting Colombo to Horana is one such possibility. Presently, the Horana Corridor ranks 6th within the CMR, carrying around 130,000 passengers per day (in both directions) at CMC limits. This reduces to around 20,000 just before Horana.

The only rail-based opportunity arises from a radial rapid transit linkage between Horana and Colombo. However, this possibility will become viable only if the present transport flows increase by at least two folds to be even considered for economic viability and perhaps three to four folds for financial viability. For a population growth rate of 3-4% p.a., the transport demand would double only in 15 years and treble in 25 years. A proposal could be made to study and introduce rapid transit to Horana as a long-term recommendation, one that would necessarily have to be based on the success of Horana as a Growth Centre, and provide for its continuing prosperity rather than one that can contribute to its initial development. Reservations could be kept for deployment of rapid transit in the future.

Medium and Short-term Proposals

The following strategic proposals would provide short to medium term impacts. These are discussed separately

Colombo-Horana Road (B5)

There is a suggestion for further widening of the B5 as the Transport Master Plan proposes. However, this would be difficult since curvatures are a problem for widening to four lanes. Moreover, land acquisition would also pose a considerable hurdle. Thus the contribution of widening the B5 which is the most important connection to Horana will be of little impact.

Panadura-Horana-Ratnapura (A8)

The A8 is earmarked to be developed within the next few years. This would mean a rehabilitated and widened road section between Panadura and Ingiriya.
However, only slight reduction in curvature would be possible. There are no intersection controls proposed as yet, and parking and segregation of non-motorised traffic have not been addressed in these proposals. These unresolved issues would continue to be a problem and speeds on the A8 are unlikely to increase sharply, especially around Horana town area. The new requirements arising from the HGC would need to be incorporated in to the road development proposal. These would include the need for intersection control, the development of some by-passes, control of parking and the elimination of accident black-spots.

**Improvements to Horana Study Area Roads**

The improvements to the road network in the study area are proposed in order to link the proposed zones and land use effectively and efficiently (see Map 02). The main driving force of the proposal is to increase connectivity of the proposed SH to the proposed development zones of the HGC. This will certainly boost the on-going and proposed development activities of the area.

**Improvements to Bus Transport**

Absence of a good public transport service is bound to pose serious problems in attracting employees from outside areas to this zone. Particularly, the absence of direct bus routes from the southern areas such as Matugama and Bulathsinhala to this zone is seen as disadvantageous factors when considering the potential employee base of these regions. Therefore it is imperative that public transport system improved to facilitate the planned development. Some of the present bus services from Bulathsinhala and Matugama areas may be considered for extension to Pokunuwit or to Colombo to attract people to this zone for employment. The proposed Southern Highway presents a good opportunity to attract employees from other areas to Enterprise Zone, as it is located close to the interchange at Raigama.

**Facilities for Pedestrians**

A noticeable feature of the present transport system of the Horana town is the absence of proper facilities to the pedestrians. As a result, the pedestrians are the most vulnerable group of road users within the town area. The past accident records clearly substantiate the above. As such a number of proposals are made to ensure the safety of pedestrians.

**Parking Facilities**

Since on-street parking has lead to severe congestion and adequate land is not available to provide widening of the main road (A8) in Horana town area, it is proposed to take necessary steps to discourage on-street parking. Instead, off-street parking should be provided at selected places.
Relocation of Horana Market

Since the existing market is located very close to the main intersection of the Horana town, it causes severe traffic congestion, particularly on Anguruwatota Road. The need to expand the market in the future means further worsening of the traffic congestion. As such, the market should be relocated at one of the locations shown in the Map. New bus terminal is to be located in this land. The proposed road network may be utilized to access the pola by-passing the Horana town area. There are about 125 retail stores in the market. The traffic generated by the pola is expected to increase at 3% p.a. Off street parking facilities should be provided for the goods vehicles and bicycles. The land requirement for the pola is about – hectares.

Relocation of Bus Terminal

At present, the daily passenger boarding is over 45,000 at Horana Town. There are over 40 bus routes starting from Horana. The existing bus terminal is inadequate and expansion is very difficult. In addition, it has aggravated the traffic congestion within the town area as the only entrance to the bus terminal is from the A8 road. The absence of sidewalks on the main road (A8) leading to the bus terminal has resulted in many accidents in the past especially during the peak hours. As such, it is proposed that the bus terminal to be relocated at the premises currently used for the “Pola”.

Development of a Loop of Bicycle Lanes

Bicycle lanes are by and large used in major cities in developed and developing countries in order to enhance the relationship between nature and people. Transport strategies to the HGC would identify this short-term proposal as an outcome of the existing physical, environmental and socio-economic characteristics of the study area. Accordingly, the proposed circuit of bicycle lanes is shown in the Map 2. Bicycles lane network would encourage people to undertake short distance trips with minimal safety problems as these lanes are exclusively for bicycles. This is possible as the distances chosen between the four development zones are 3-5 kms. The bicycle lane from Bellapitiya junction to Botee junction in Horana Town would facilitate the bicycle movement to market and retail shops in the area as well.

CONCLUSIONS

The foregoing analysis has explicitly outlined the major transport features and issues based on the proposed zones and land use of the HGC. The identified issues in transport reveal that the level of service and the quality of transport is below the satisfactory level in many aspects – average speed, parking, roads and related service conditions etc. As a result, this study has identified the major transport strategies and proposals to the HGC. The strategies outlined include long-term, medium-term and short-term in order to make the HGC a sustainable and growth-oriented center for the area.
REFERENCES


