NATIONAL HOSPITAL OF SRI LANKA

TRAFFIC ANALYSIS OF DEVELOPMENT MASTER-PLAN

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Persons Arriving at NHSL per day

- **Staff** - 6,000+ (arriving over different shifts with the highest population between 8 am and 5 pm)
- **OPD/Clinics** - 10,400 (with average of 6,500/7,000 patients plus accompanying persons)
- **Ward Visitors** - 10,000 (mostly during mid day and evening, few during morning)
- **Other Units** - 3,000 (spread throughout the day)
- **General Visitors/Business purposes** - 4,000 (mostly morning time)

These add up to 33,400 persons arriving at the NHSL complex during a weekday.
Summary Findings

- Approx 64%, (22,000) persons arrive by bus/train alighting at bus stops at Town Hall, Punch Borella that are between 500 m to 1 km. Over 60% of bus users complain of the distance.

- Around 2,500 persons arrive walking or by bicycle including doctors and nurses provided hospital quarters also others.

- Only 25% staff arrive by vehicle. Around 3,500 staff vehicles enter to park, 20% park for over 3 hours. Av duration is 1.5 hours.

- Visitors and patients parking requirement is around 2,000 with parking at the OPD car park, along Norris Canal Road and the Central Hospital and even Odel.

- There are 53,000 pedestrian entries to all buildings such that on one person on average enters a building 1.5 times.

- There are 25,000 crossing of the main road junction near OPD.
There are over 1,000 wheel chair movements and around 500 stretcher movements per day mostly to and from the OPD and clinics.

There are around 50 ambulance movements per day.

On average each hospital employee visits 0.6 other buildings during a weekday making a total of around 4,000 staff movements within the complex.

The pedestrian traffic within the complex varies with a high of around 10,000 movements per day to around 3,000 to 5,000 around wards.
There are 7,000 patients per day. There are 0.6 persons accompanying patients making up around 11,000 persons.

Currently 70% of them arrive by bus, a further 4% use bicycles. Around 1,500 vehicles arrive for the OPD most 3 wheelers drop and go.

There are currently around 300 wheelchair and 160 stretcher movements per day to and from the current OPD.

The arrival starts prior to 7 am and reaches a peak between 8 and 11 am with a maximum 2,500 to 3,000 at that time.

Significant number of trips made between the OPD and other units of the hospital. They have to pass congested road sections.

Patient admission, registry and examination are not integrated to a information data system.
Current OPD Patient Movements

- Pedestrian Count (in)
- Pedestrian Count (out)
- Storage
Origin of OPD patients

- CMC: 32%
- Outer CMC: 36%
- Outside Colombo District: 32%
Mode of Arrival of OPD Patients

- Train: 0%
- Bus: 75%
- Car/Van: 4%
- Taxi/3 Wheeler: 13%
- Motor bike: 5%
- Bicycle: 1%
- Walking: 2%
- Train: 0%
Drop Off Point

- Deans Road
- OPD
- Punchi Borella
- Town Hall
- Other

Percentage:
- Bicycle
- Motor bike
- Taxi/3 Wheeler
- Car/Van
- Bus
- Train
Parking Locations of OPD Patients

- Central Hospital
- Norris Canal Rd/Kinsey Place
- OPD Car Park
- Other
Group Size of OPD Patients

- Group size of 2 patients make up the highest percentage at 52%. 
- Group size of 3 patients make up 20%. 
- Group size of 4 patients make up 16%. 
- Group size of 5 patients make up 12%. 
- Group size of 1 patient makes up the remaining 2%.
Visit Frequency

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Daily</td>
<td>0.2</td>
</tr>
<tr>
<td>Few days per week</td>
<td>0.7</td>
</tr>
<tr>
<td>Weekly</td>
<td>2.0</td>
</tr>
<tr>
<td>Few days per month</td>
<td>13.1</td>
</tr>
<tr>
<td>Monthly</td>
<td>39.6</td>
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<tr>
<td>When required</td>
<td>44.3</td>
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</tbody>
</table>
Visitors for In-Patients

- Around 10,000 persons arrive to visit the patients in 3,300 beds.
- The noon peak is 5,000 while evening attracts around 4,000.
- Average group size is 1.8, this means that around 5,500 groups visited the wards with 1.7 groups per bed. The most common entry points to the complex are the Bandaranayake Building and Accident Service.
- Like the patients arriving at the OPD, 67% (or 2/3rd) of visitors arrive by bus, with three wheelers and taxis carrying the largest share of private vehicle users.
- The most common parking locations are on Norris Canal Road.
- There is congestion at the entrances prior to the visiting hours. The lack of standard signage leads to much confusion and congestion and extra walking.
Origins of Visitors

- Outside: 49%
- Colombo - Other: 37%
- CMC: 14%
Arrival Mode of Visitors for inpatients

- **Bus**: 67%
- **Taxi/3 Wheeler**: 14%
- **Car/Van**: 8%
- **Motor bike**: 7%
- **Bicycle**: 1%
- **Walking**: 2%
- **Other**: 0%
- **Train**: 1%
Group Size of Visitors for Inpatients
Hospital Staff

- An estimated 6,000+ staff report for duty during the day time.
- Unlike patients and visitors a much lower percentage of staff (54%) arrive by bus and train. This is partly due to the fact that 25% walk to the hospital.
- Motor cycles make up the largest mode of private transport.
- The total number of vehicles that bring staff is estimated at 1,200. It is found that on average vehicles parked within the complex make around 2.5 trips.
- Thus out of the 4,000 vehicle entries per day, approximately 75% are staff vehicles.
- There are 1,000 wheel chair movements recorded at different location within the hospital.
Travel Origins of Hospital Staff

- Colombo
- Galle
- Gampaha
- Kaluthara
- Kegalle
- Kurunegala
- Ratnapura

- Percentage
- Other
- Minor Staff
- Administrative & Technical Staff
- Nurse
- Doctor
**Staff Arrival Mode**

- **Train**: 2%
- **Bus**: 52%
- **Car/Van**: 13%
- **Taxi/3 Wheeler**: 3%
- **Motor bike**: 4%
- **Bicycle**: 1%
- **Walking**: 25%

*Legend:
- Train
- Bus
- Car/Van
- Taxi/3 Wheeler
- Motor bike
- Bicycle
- Walking*
Staff Parking by Location

- Bandaranayake Building...
- Blood Bank
- Cardiology Unit Park
- Dental car park
- Pharmacy & Kitchen Gate...
- Neuro Building Car Park
- OPD Car Park
- Other

Percentage Arriving by Vehicle:
- Bicycle
- Motor bike
- Taxi/3 Wheeler
- Car/Van
Transport Issues of Staff

- High walking distance
- Not enough parking
- Not enough 3W/Taxies
- Crowded Walkways
- Traffic Con儿estion

Options:
- Walking and Bicycles
- Using Private Vehicles
- Using Bus and Rail
Overall Mobility within Hospital
Pedestrian Movements @ gates

Count

Cardiology Unit 1
Cardiology Unit 3
Cardiology Training School
Nurse’s Quarters
Nurse’s Quarters (Near NTS)
Doctor’s Quarters Entrance
Pharmacy & kitchen
Dental Gate
Ward 54
Orthopedic Clinic 18
Orthopedic Clinic 19
ICU and Wards
Neuro Trauma Building
Accident Ward
Bandaranayake Building
ENT Clinic (Ward 1)
OPD Gate 1
OPD Gate 2
Filling Station
AIDS Unit
Diabetic Clinic
Accident Service Movements

- Pedestrian Count (in)
- Pedestrian Count (out)
- Storage
Bandaranayake Bldg Movements

Pedestrian Count (in)
Pedestrian Count (out)
Storage
NHSL Complex Movements

- Pedestrian Count (in)
- Pedestrian Count (out)
- Storage

Graph showing the number of pedestrian counts and storage movements over different time periods.
Staff Movements to buildings
Internal Pedestrian Flows

Count per Hour (all directions)

- OPD
- Telecommunication Exchange
- Near ward 16
- GCOT
- 34,35 wards
Pedestrian Movements at all Junctions

![Pedestrian Movements Graph](image-url)
Vehicle Parking

- Less than 1 Hour: 60
- Less than 2 Hours: 10
- Less than 3 Hours: 5
- More than 3 Hours: 30
Ambulance Movements

Departure Hour

Arrival Hour

Total Ambulances

07:00-08:00
08:00-09:00
09:00-10:00
10:00-11:00
11:00-12:00
12:00-13:00
13:00-14:00
14:00-15:00
15:00-16:00
16:00-17:00
17:00-18:00

0
10
20
Rec.#1: Access

- The key highway intersections through which road traffic requires to access the hospital are already congested.

- The income led growth in traffic is likely to see doubling of vehicle movements and parking over a period every 10-12 yrs.

- Attracting patients from higher income groups will result in a faster growth.

- Expansion should necessarily be integrated to improved high quality public transport.

- Access from bus stops at Punch Borella, Town Hall, Ward Place and next to Carey College should be integrated to the design to minimize walk distances and pedestrian congestion.

- Increase residential quarters.
Rec.#2: Improved Public Transport

- To integrate the master-plan design with the proposed monorail system.
- Until then a shuttle bus service be operated from Borella, Maradana and Town Hall at 5 minute intervals to serve the hospital through the EW Perera Mw.
Proposed Route of Monorail
Sketch of the Proposed National Hospital Station
Rec.#3: Parking

- Current Parking Capacity is 350 spaces taken up by Staff most of the day. The public requirements is around 400. This will double every 10 years. More if public transport deteriorates and if patient profile changes.

- Increased parking is not sustainable for the road network both outside and inside the hospital complex.

- Staff parking should not be centralized. New multi-storey buildings should have required parking accessed from periphery.

- The multi-storey car park proposed in phase 10 is not the most central location for visitors or staff.

- The public car parks should be connected to a pedestrian walkway system that would not interfere with the vehicular traffic or hospital operations.
# Parking Space Requirement

<table>
<thead>
<tr>
<th>Type of Usage</th>
<th>Parking Space Requirement</th>
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<tbody>
<tr>
<td></td>
<td>Standard (S)</td>
</tr>
<tr>
<td>HEALTH</td>
<td></td>
</tr>
<tr>
<td>i. Nursing Homes and Private</td>
<td></td>
</tr>
<tr>
<td>Hospitals</td>
<td>2 for 3 beds</td>
</tr>
<tr>
<td>ii. Consultation Rooms (min.</td>
<td>6 for 1 consultation</td>
</tr>
<tr>
<td>size of rooms to be 8 Sq.m.)</td>
<td>room</td>
</tr>
<tr>
<td>iii. Medical Laboratories and</td>
<td>1 for 10 sq.m.</td>
</tr>
<tr>
<td>OPD Areas</td>
<td></td>
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Rec.#4: Traffic Circulation

- Ensure that access to all parking lots in the proposed design have both entry and exits from the roads on the periphery.
- The section of EW Perera Mw between Norris Canal Road (adjacent to Neuro Trauma Unit) and Kynsey Road (near Cardiology unit) should be restricted for labeled vehicles or vehicles that have special permission.
- In order to ensure the free flow of traffic, reduction of vehicle emissions and noise pollution, pedestrian traffic be separated away from the ground level as far as possible.
- The restriction on visiting hours for in-patients to be relaxed to ease the requirement for parking and improve utilization of parking spaces.
Rec.#5: Pedestrian Management

- Elevated pedestrian walkway along EW Perera Mw at the 3rd floor level (8-12 meters) spanning between the two stations and extend to bus stops. Escalators may be considered to bring them in line with the standard being implemented at Kollupitiya and Bambalapitiya pedestrian over passes and public car parks.
Pedestrian Management

- Provide signs to international standards.
- A suitable patient management system for OPD/Clinics that would reduce patient time spent, circulation and congestion.
- Not to allow mixing of out-patients and in-patient.
- The waiting areas, walkway widths, lobbies to be designed as per international standards for capacity and ergonomics.
- Commonly used conveniences to be located adjacent to the walkways but without interfering with pedestrian movements.
- Visiting Hours may have to be spread out
Rec. #6: Ambulances, Wheel Chairs, Stretchers and Hospital Staff Movements

- 2nd walkway system accessible only for hospital staff and for wheel chairs and stretchers as well as carrying medicines, meals and other trolley related movements. It should be restricted to all others.

- There should be a pathway for ambulances through the hospital complex from any approach to the accident service, cardiology unit and any other unit where emergencies are dealt with.
Rec. # 7. Planning and Design Audit

- The architects plan for each individual development phase be subject to:
  1. A design audit for traffic and mobility
  2. A traffic and mobility consultant in design team
  3. A traffic impact assessment as per Building Regulations of the UDA.