

ToR for detailed design, drawing and report preparation of Vehicular underpass at Baneshwor Junction for through traffic between Bagmati Bridge(Arniko Highway) and Dhobi Khola Bridge (Arniko Highway) and at Maharajung Chowk Junction for through traffic between Dhumbarahi (Ring Road) and near Basundhara Chowk (Ring Road)

1. Background

Over the past decade, there has been a dramatic growth in the numbers of vehicles operating within the Kathmandu Valley and a consequent rapid deterioration in overall traffic conditions, with considerable congestion now being experienced throughout much of the day. Over the same period there has been a substantial increase in the overall population and a significant expansion in the extent of the urbanised area. Public transport services within Kathmandu valley are provided entirely by the private sector, using a mix of vehicle types including medium buses, mini-buses, micro-buses, tempos and taxis. The services have developed in response to demand but are poorly and inadequately regulated and controlled, with the result that passenger comfort, convenience and safety are compromised, the route network is unplanned and often inappropriate, and the vehicles are inefficient users of road space. These have resulted in increased numbers of accidents, the unregulated growth in public transport services and unacceptable levels of congestion at a number of key locations throughout the Valley. To cope the traffic congestion problem of city centers, the options of mono-rails, metro rails, cable car are floated in the mind of national planners.

Underpass Structure is one type of Bridge Structure. In which the Traffic is Heavy on the crossing or at the junction, Underpass Structure is Provided. Underpass structure is a called one type of Grade Separator. In Highway which is above 4 lane or 6 lane Highway underpass is frequently provided at the junction and crossing due to heavy traffic. In underpass Bridge Structure is many types Vehicular underpass, Pedestrian Underpass or Cattle Underpass and Vehicular Uunderpass etc., this all are the called Grade Separator required width of Span is necessary more than provide the Vehicular Uunderpass but span width is providing less so go through the Vehicular underpass and Pedestrian/cattle Underpass. The Bridge Branch/Department of Roads is seeking qualified consulting firm for detailed design, drawing and report preparation of Vehicular underpass at Baneshwor Junction for through traffic between Bagmati Bridge(Arniko Highway) and Dhobi Khola Bridge (Arniko Highway) and at Maharajung Chowk Junction for through traffic between Dhumbarahi (Ring Road) and near Basundhara Chowk (Ring Road).



Site 1: Bagmati Bridge(Arniko Highway) and Dhobi Khola Bridge (Arniko Highway) 1.47 KM



Site 2: Dhumbarahi (Ring Road) and near Basundhara Chowk (Ring Road) 0.5 Km

2. Objective of the Service

The objective of the consultancy service is to prepare detailed project report of Vehicular underpass at Baneshwor Junction for through traffic between Bagmati Bridge(Arniko Highway) and Dhobi Khola Bridge (Arniko Highway) and at Maharajung Chowk Junction for through traffic between Dhumbarahi (Ring Road) and near Basundhara Chowk (Ring Road).

3. Scope of the service

The scope of the service are, but not limited to :

- Topographical survey of the road section covering RoW + 2x 10m, Contours at 0.25 m interval in plain area.
- 3 days 24 hr traffic study at the intersection
- Geotechnical Investigation

Bore Holes each to a depth as mentioned in the Bill of Quantities and as explained below preferably at the possible locations as per structure proposed in preliminary design with conduction of SPT. The number of SPT as mentioned in the BOQ with suitably distributed over the depth of the boreholes. The depth of soil exploration from ground level not exceeding 25m.

Depth of soil exploration done must be certified by the branch for each bore hole and samples of soil (about ½ Kg) in each strata found in each bore holes should be submitted in plastic bags duly labeled to the branch for the record.

Laboratory Tests to be carried out

- (i) Natural moisture content
- (ii) Sieve analysis
- (iii) Hydrometer analysis
- (iv) Atterberg's limit
- (v) Specific gravity
- (vi) Unconfined compression test
- (vii) Direct shear test
- (viii) Consolidation test

Determination of engineering properties and geotechnical parameters of each layer of soil.

- Based on the collected information and results of the discussions mentioned above the consultants shall design considering the issues of section 4 of the ToR.
- The consultants shall produce detailed quantity estimate of vehicular underpass including all related structure for traffic management at the junctions.
- They shall collect information on sources of materials and their lead distances and prepare rate schedules and cost estimates based on the standard norms and prevailing district rates.
- Reporting : Inception Report , including desk study findings, detailed revised work and manning schedule. Preliminary design report shall be submitted after performing the traffic study. After geotechnical investigation and detailed design as per finalized preliminary design, Draft DPR shall be submitted to the Bridge Branch/DoR for their comments. After receipt of comments of the BB/DoR, the Final DPR shall be finalized duly incorporating the comments of the employer.

4. Detailed Design Considerations

- As far as possible, the underpass roadway shall conform to the natural lines of the highway at the approaches as regards alignment, profile and cross-section. The lane for through traffic shall be not less than 4.
- Road profile shall not dip too sharply under the structure as that will produce a considerably enhanced sense of restriction when compared with a profile that proceeds smoothly through.
- Sufficient provisions for other direction traffic, without compromising the recent facilities. All existing service lanes shall be at level with additional improvements.
- Provision for merging and diverging option from Fast lane to Service lane and vice versa, not closer than 120m left and right of Baneshwor Junction and 100m left and right of Maharajung Chowk Junction
- Underpass shall be designed as per Indian standard such as a IRC:6, IRC 78 and IRC 112 and others IRC standards in India.
- Construction of Underpass in different type of consideration is effect on them. Geometry, Foundation and Earth Pressure, Vehicle Loads, Friction Forces, Earthquake Loads and Secondary Effects, Materials, Construction methods, Environmental constraints, Requirements of affected Authorities, Aesthetics of the structure and surrounds.
- The Design of Underpass Structure in considered the structure depths of Girder and Deck Slab. If Box girder type underpass in L/24+0.3 (m) Depth and Beam and Slab Type Underpass in L/18+0.3 (m) types of Structural Depths is used. Structural Economy is major impact on the Project cost, in which type of Structure is Designed and the Underpass is on curvature or not is much effect on them.

- Retaining walls used for forward and Backward of underpass of structure, to retain the soil on retaining walls. They shall be designed by a qualified geotechnical condition. Design assumptions including soil parameters slope and quality of backfill, drainage provisions etc. shall be clearly specified on the drawings.
- Conscious effort must be made to create a sense of freedom for the drivers travelling through the underpass. In order that capacity, speed and safety of travel are not affected, the lateral and vertical clearances at underpasses must be adequate.
- Lateral clearance is the distance between the extreme edge of the carriageway to the face of the nearest support whether it is a solid abutment, pier or column. : Min. 2m on either side
- Vertical clearance stands for the height above the highest point of the travelled way, i.e., the carriageway and part of the shallers meant for vehicular use, to the lowest point of the overhead structure. : Min. 5.5m so that double-decker buses could be accommodated.
- Longitudinal drainage of structures shall be provided for run-off from a 1 in 10-year frequency storm. For structures carrying freeway traffic, there shall be no flooding of traffic lanes. Provision shall be made for longitudinal drainage on bridges and underpass. The longitudinal slope of a bridge carriageway shall be a minimum of 1% except over water where a horizontal structure is acceptable. The cross falls on the bridge are to match those on the abutting pavements. Consideration shall be given to the effect of drainage outlets.
- Protect vehicles from accidents with abutments or piers. Guard-rails must be provided at a suitable height at road edges and as carriageway divider. These shall be of a robust design to effectively resist disturbance of the support in the event of a collision.
- Safety considerations :Appropriate lighting, Use of appropriate warning signs , Comprehensive plan and design for utilities relocation.

5. Expert required

- Team Leader / Geotechnical Engineer : International
- Structural Engineer

A. Key Professionals (CV will be Evaluated)	
Team Members	Education Qualification and Experience
Team Leader/ Geotechnical Engineer (International)	<u>Education:</u> • Minimum: Graduate in Civil Engineering • Desirable: Masters in Geotechnical Engineering <u>Experience:</u> • Total Experience- 20 years • Experience in Road Related Field- 15 years • 10 years experience as a Geotechnical Expert and minimum experience of 3 Vehicular Underpass Planning and Design (SAARC Region)
Structural Engineer	<u>Education:</u> • Minimum: Graduate in Civil Engineering • Desirable: Masters in Structure Engineering/Bridge Engineering

A. Key Professionals (CV will be Evaluated)	
Team Members	Education Qualification and Experience
	<u>Experience:</u> • Total Experience- 15 years • Experience in Road Bridges related field - 10 years • 5 years experience as a Structure/Bridge engineer in road & bridge projects

6. Reporting

- 2 copy of Inception Report within 3 week of Work order
- 2 copy of Preliminary Design Report within 6 week of Work order
- 3 copy of Draft DPR within 18 week of Work order
- 3 copy of Final DPR Report within 2 week, after comment on draft report.

7. Mode of Payment

- 20% of the contract amount after completion after submission and approval of Inception report.
- 60% of the contract amount after submission of the Draft Report
- Remaining Final Payment after submission and acceptance of the Final Report and after returning all the documents, maps and reports, if borrowed from the DoR.