

2018

## DPR FOR PEDESTRIAN UNDERPASS AT CLOCK TOWER CIRCLE



PROJECT MANAGEMENT CONSULTANT FOR MANGALORE SMART CITY PROJECT



## ISSUE AND REVISION RECORD

Revision	Date	Originator	Checker	Approver	Description	Standard
0	26/02/2018	WTESL/LBI/C DAC	URVI BHATT	URVI BHATT/ KAVITA WAKADE	DPR	
1	04/09/2018	WTESL/LBI/C DAC	URVI BHATT	URVI BHATT/ KAVITA WAKADE	DPR	
2	03/10/2018	WTESL/LBI/C DAC	URVI BHATT	URVI BHATT/ KAVITA WAKADE	DPR	Revised based on removal of BIBI Alabi Underpass
3	02/11/2018	WTESL/LBI/C DAC	URVI BHATT	URVI BHATT/ KAVITA WAKADE	DPR	Revised Pedestrian Plaza with 5m Staircase
4	29/01/2019	WTESL/LBI/C DAC	URVI BHATT	URVI BHATT/ KAVITA WAKADE	DPR	Modified the BOQ based on revised SOR 2018 – 19

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## 1. EXISTING SCENARIO

### 1.1 INTRODUCTION

Hampankatta is the heart centre of Mangalore City, Karnataka and Clock Tower Circle is one of the busiest junctions in the area. The area is dotted by strategically import offices and amenities as listed below:

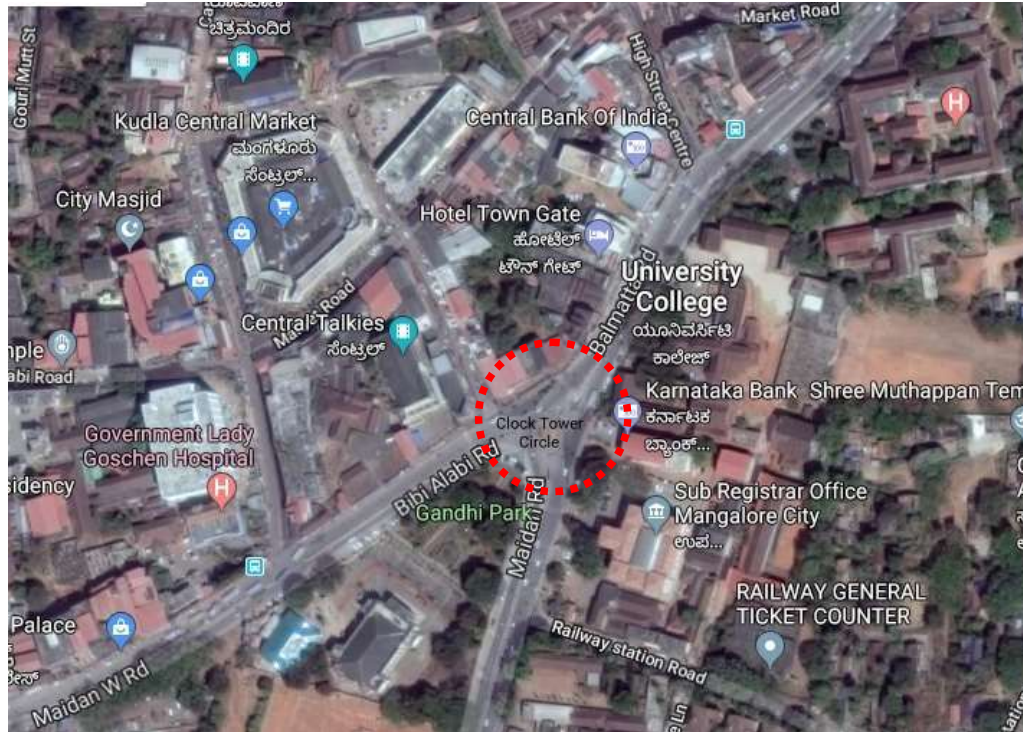


Figure 1: Satellite Image of the Area (Ref: Google Earth)

#### Public Utilities:

**Service Bus Stand:** The bus stand is located adjacent to Nehru Maidan and all private run express and shuttle buses to various places around Mangalore start form this bus stand. Selected KSRTC buses also start from this bus stand

#### Town Hall:

This hall mainly hosts the cultural activities like Dramas, sports championships etc

#### Nehru Maidan:

This playground is open for common public. All kind of sporting activities, political rallies, Republic day parades are conducted here.

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**Hospitals:**

Wenlock, which is the largest hospital in Dakshin Kannada and Lady Goschen hospital are located around this area.

**University:**

University College is also located in this area.

**1.2 NEED FOR PROPOSED INTERVENTION**

The Clock Tower Junction with a number of strategic buildings around and 2 main roads aligning the junction generates huge pedestrian and vehicular traffic. Also as major bus routes originate from the Service Bus Station pedestrian traffic is accentuated at peak hours.

This great increases the pedestrian – vehicular conflicts at multiple locations around in this area, slowing down the vehicular traffic and increasing the risk of accidents. Seamless connectivity to any side of the circle is highly recommended.

PWD had proposed a pedestrian bridge across Nehru Maidan Road. But the proposal only target part of the entire problem. So a pedestrian underpass is proposed to address the issues.

**1.3 MERITS AND DEMERITS OF GRADE SEPARATION**

Most pedestrian crashes occur while the pedestrians are attempting to cross the road. One effective way of preventing crashes between vehicles and pedestrians is placing them at different levels, or 'grade separating' them.

In urban situations where pedestrian crossing signals would cause congestion or crashes (due to high traffic speeds), a grade separated pedestrian crossing, such as an overpass or an underpass, may be used. Outside of urban areas in situations where there is pedestrian demand in high speed environments, this treatment may also be applied.

Pedestrian over-bridge needs to be elevated to 5-6m above the road level to allow large vehicles to pass through. As such the pedestrian has to climb more steps. This in turn leads to reduced use of the proposed walkways and eventually they try to cross the road as was the condition earlier. Subway in this case proves to be more effective as the depth of the underpass can be as low as 4m.

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Grade separated pedestrian crossings reduce pedestrian crashes but they also have some disadvantages

- They are costly
- They sometimes become crowded with street traders
- Pedestrians may avoid them if there are a lot of steps to climb up or down
- If they are not well-lit and patrolled, they may pose a personal security risk
- Underpasses are susceptible to flooding and can become unusable if not routinely maintained.

**Benefits:**

- Reduced pedestrian/vehicular conflict.
- Can help to reduce fatal and serious injuries involving pedestrians and bicyclists.
- Traffic flow improvements.

**Implementation Issue:**

- Pedestrians tend only to use crossing facilities located at, or very near, to where they want to cross the road. Pedestrian fencing can be used to encourage pedestrians to use crossing facilities.
- Where a lot of bicyclist traffic is present a pedestrian underpass or overpass can be used by cyclists as well as pedestrians, but this will require shallow approach ramps and therefore additional land.
- Consideration should be given to improving accessibility for the mobility impaired. This may include design features such as sufficient width to accommodate wheelchairs and ramps or lifts as an alternative to steps.

## 1.4 OVERALL APPROACH

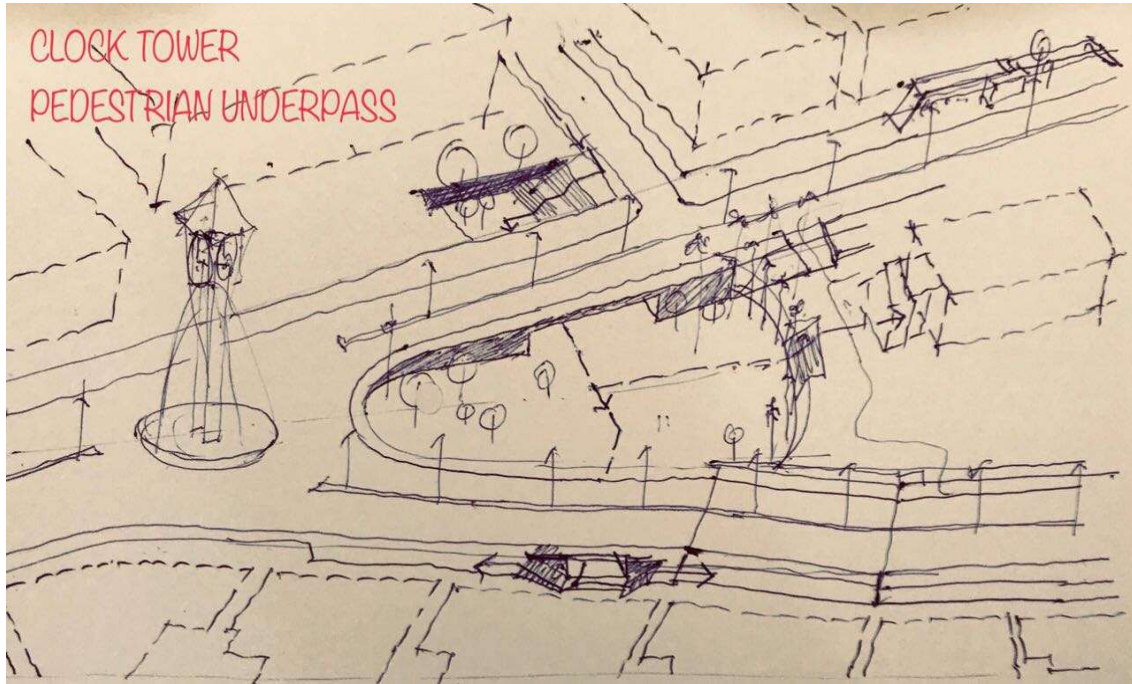


Figure 2: Conceptual Sketch of the Underpass

The proposed underpass is conceptualized considering the existing Gandhi Park as a focal point and utilizing the same as a plaza. This would enhance the visibility of the actual underpass thereby making minimizing the security concerns. Also the park which is currently underutilized can be put to better public use.



Figure 3: Existing View of Gandhi Park



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The entire development comprises of 1 underpass.

The first one passes under the Nehru Maidan Road catering to the pedestrian traffic oriented towards Station, PWD offices, Mini Vidhan Soudha, University College and Wenlock Hospital.



Figure 4: Location of Underpass entrance on Mini Vidhan Soudha Compound

Multiple accesses to the underpasses, one on either side of the roads are planned for eliminating the vehicular – pedestrian conflicts.

The width of the underpass is increased to 10m so as to eliminate the claustrophobic effects of any underground structure. The sidewall of the underpass can be used for Advertisement panels for revenue generation and also for depicting the cultural heritage of the city.



Figure 5: Concept for Advertising

## 2. EXPECTED BENEFITS AND BENEFICIARIES

The proposed underpass is proposed to offer the following benefits to the identified beneficiaries:

- **Citizens / Commuters**
  - a. Hassel free commuting
  - b. Enhanced travel experience and make waiting a entertaining experience
  - c. Easy access for physically challenged through ramps and elevator.
- **Local Authority/ MCC:**
  - d. Reducing traffic congestions by eliminating pedestrian signals and crossings.
  - e. Better security for citizen by increasing visibility
  - f. Generate revenue through advertising spaces which can alternatively reduce the operational cost and generate profits.
- **Businesses**
  - g. Prime locations for marketing hoardings for maximum reach
  - h. Further addition of stalls can be conceptualized.

## 2.1 STAKEHOLDERS/ ORGANIZATIONS INVOLVED

- Citizens
- Mangaluru Smart City Limited (SPV)
- Mangaluru City Corporation
- Regional Transport Office, Mangaluru
- Mangaluru Smart City PMC
- District Collectorate

## 2.2 PRE-REQUISITES

The identified project involves space utilization from existing Government building and Private building compounds for construction of staircases and ramps along the existing footpaths, following are the concerns areas which need resolution, as this may affect the project timelines:

### a. Land acquisition from Mini Vidhan Soudha Complex

For the purpose of construction of staircase leading to the underpass a land parcel of around 20m x 7m into the Mini Vidhan Soudha Complex is required at the corner junction of Station Road and Nehru Maidan Road.

### b. Dependability of Road Up gradation works

The proposed underpass is also dependent on the road upgradation works on Nehru Maidan road and Bibi Alabi road included under the Smart City proposal for Smart Roads.

## 2.3 TIMELINE FOR DESIGN AND EXECUTION

- |  |               |
|--|---------------|
| ▪ Submission of Concept and Pre Feasibility report | 26th Feb 2018 |
| ▪ Approval of Concept/ pre-feasibility report:     | T0            |
| ▪ Submission of draft DPR:                         | T0 + 4 weeks  |
| ▪ Finalization of DPR with MCC consultation:       | T0 + 6 weeks  |
| ▪ RFP/ Tender Floating:                            | T0 + 10 weeks |
| ▪ Bid Process including Evaluation:                | T0 + 14 weeks |
| ▪ Project Implementation                           | T1            |

*Note: Implementation completion would be dependent on works of other Infrastructure Projects like Smart Roads, Utility divergence etc.*

### 3. PROPOSED INTERVENTION

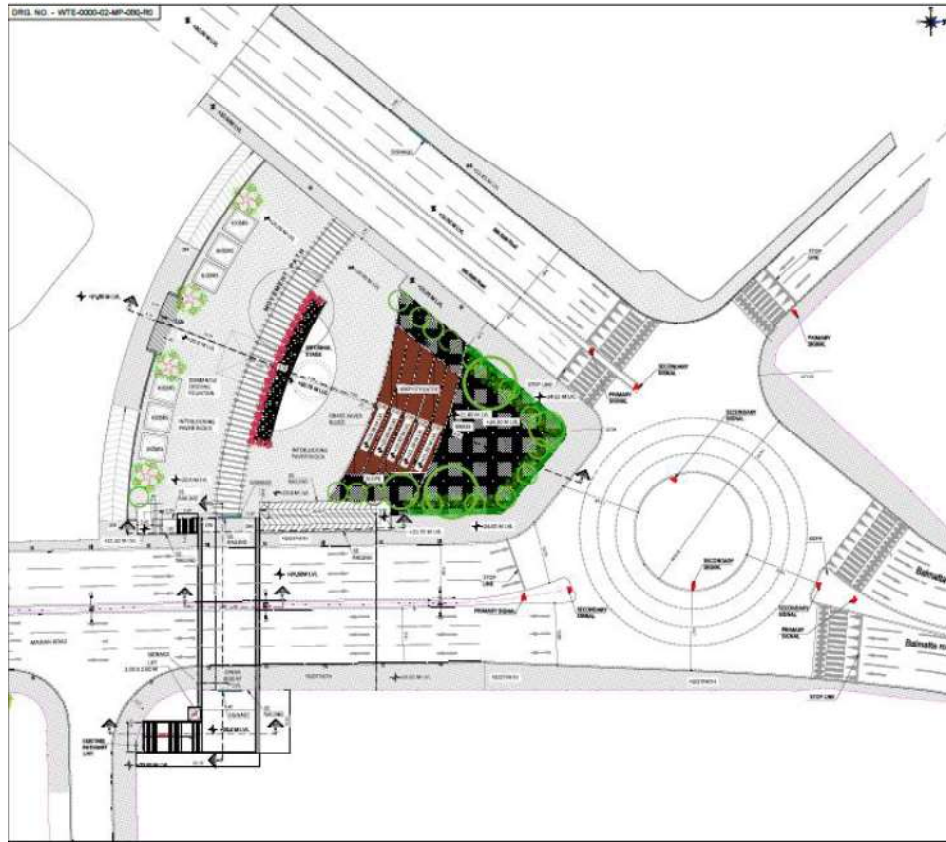


Figure 6: Proposed Master plan ( Revised as per TCM dt. 22.10.2018)

#### Key Features:

1. Multiple entry / exit point on either side of the road for ease of access.
2. Each access paired with Staircase and Ramp for Physically Challenged.
3. Renovation of Gandhi Park into a plaza.
4. Generating commercial potential by dedicating spaces for Kiosks within the plaza.
5. Provision of space for commercial advertising and murals depicting city heritage along the underpass walls.
6. Accentuating the axis between the Clock Tower, Gandhi Statue and Town Hall.
7. Effective use of existing contour levels to minimize cutting and filling.

For detailed drawings Refer Annexure 1

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Figure 7: Birds Eye View of the Proposed Plaza



Figure 8: Proposed View of the Plaza



Figure 9: Proposed View 2 of the Plaza from Clock Tower Junction

## 4. Design Standards, Methodologies & Specifications

### 4.1 Design Standards for Bridges and Structures

The design philosophy is primarily based on relevant IRC codes of practices, IRC specifications, latest guidelines and circulars of MORTH and relevant Bureau of Indian Standards (BIS).

#### **Broad Features**

The underpass consists of a clear span of 8.8 m and vertical clearance of minimum 3 m. The total length of the underpass is 33 m

#### **Guiding Standards for Structures**

The designs of proposed structures for the new constructed road have been carried out in accordance with the provisions of the following IRC Codes/guidelines.

IRC-5-2015 Section I, General Features of Design

IRC-6-2016 Section II, Loads and Stresses

IRC-112-2011 Code of Practice for Concrete Road Bridges

IRC-78-2014 Section VII, Foundations and Substructures

IRC-SP: 13-2004 Guidelines for the design of small bridges and culverts.

## 4.2 Seismic Design

The project road falls in Seismic Zone III, as per the zoning specified in IRC-6-2016.

## 4.3 Soil Parameters:

The following soil parameters have been specified for material for back fill behind abutment of bridges and culverts and the abutment structure have been designed accordingly.

$$\phi = 30^{\circ}$$

$$\delta = 20^{\circ}$$

$$\gamma_d = 18 \text{ KN/m}^3$$

$$\gamma_{\text{sub}} = 8 \text{ KN/m}^3$$

A 600 mm thick granular material filter behind abutment and adequate weep holes in abutment walls has been provided for proper drainage as per IRC 78:2014.

## 4.4 Foundations

Bearing capacity assumed for design is 20 T/m<sup>2</sup> which shall be verified after detailed geotechnical investigation.

## 4.5 Miscellaneous

### Bearings

Tar paper bearings have been proposed for RCC culvert.

### Crash Barriers

Suitably designed vehicle crash barriers have been proposed as per Clause. 115.4 of IRC: 5-2015.

### Expansion Joints

Filler type expansion joints as per MORTH standard have been proposed for the culvert.

### Approach Slab

R.C.C. approach slabs, having minimum length of 3500mm and 300mm thick in M-30 concrete, have been used at either end of the bridges and culverts to ensure riding comfort and reduce vehicular surcharge on the abutment walls. One end of the approach slab is

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supported on R.C. bracket projecting out, from dirt wall while the rest of the slab on compacted soil as per the guidelines of MOST. A leveling course, 100mm thick in M-15 concrete has been used under the approach slab.

**Reinforcement:**

TMT bars of grade designation Fe 500 conforming to IS: 1786 have been used as un tensioned reinforcement in all R.C.C. works following guidelines of IRC: 112-2011 regarding permissible stresses, cover, bar sizes, spacing of bars, bond length, anchorage length, lap splices, etc.

## 5. BUDGET

### 5.1 BUDGET UNDER SCP

The current project is categorised under the following SCP Project head for budgeting.

Sr#	Project Name	Cost (in Cr)
<b>ABD Area</b>		
1	Specialized Pedestrian Facilities along certain road sections	27.82

**Note:** - As per discussion in the TCM dated 22/10/2018, the width of the staircase is widened to 5m instead of 2.5m and lift size amended as 2.0 x 2.0. For the same it was referred IRC 2012 wherein width has not been defined and mentioned that the same should be as per the volume of Pedestrian Traffic and secondly the suggestion of replacing grass bed with Cobol stone has also been incorporated in BOQ.



## 5.2 PRELIMINARY ESTIMATE

The estimate for the works is split into various components as listed below.

Sr.No.	Description	Amount
1	Civil Work	4,55,45,207
2	Landscape Work	4,34,513
3	Electrical work (Including GST)	9,41,759
	<b>Sub Total</b>	<b>4,69,21,479</b>
	Provision for Third Party Damages at 1 st Year(DLP)	7,13,669
	Maintenance Cost For 2nd,3rd and 4th Year	35,88,677
	Add 3% Contengency	14,07,644
	GST @12% on SI No.1 & 2	55,17,566
	GST @12% on Provision for Third Party Damages at 1 st Year(DLP)	,82,904
	GST @12% on Maintenance Cost For 2nd,3rd and 4th Year	4,21,800
	Escalation and Tender Primium @10%	46,92,148
	Misc Roundoff	4,112
	<b>Grand Total</b>	<b>6,33,50,000</b>

## ANNEXURE 1: ARCHITECTURAL LAYOUTS

## ANNEXURE 2: STRUCTURAL LAYOUTS

## **ANNEXURE 3: STRUCTURAL REPORT**

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## **ANNEXURE 4: ELECTRICAL LAYOUTS**

## ANNEXURE 5: STORM WATER DRAINAGE LAYOUT

## ANNEXURE 6: BILL OF QUATITITES