QMP 8.2.4 R/A

REPORT

ON

THE GEOTECHNICAL INVESTIGATION FOR THE PROPOSED GRADE SEPARATOR BY INTEGRATING SONY WORLD JUNCTION AND EJIPURA MAIN ROAD-INNER RING ROAD JUNCTION AT KORAMANGALA, WARD NO-68, BANGALORE

CLIENT: M/s. Bruhath Bangalore Mahanagar Palike,
Bangalore - 560 025

CONSULTANT: M/s. Manasa Consultants,
140-B, 2nd Floor, 9th Cross,
Margosa Road, Malleshwaram,
Bangalore-560003

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REPORT NO: 090911 – 355/R

REPORT THE GEOTECHNICAL INVESTIGATION FOR THE PROPOSED GRADE SEPARATORS BY INTEGRATING SONY WORLD JUNCTION AND EJIPURA MAIN ROAD-INNER RING ROAD JUNCTION AT KORAMANGALA, WARD NO-68, BANGALORE

1.0 INTRODUCTION

M/s. Bruhath Bangalore Mahanagar Palike, Bangalore had entrusted us to carry Geotechnical (soil) investigation for the proposed Grade Separator by Integrating Sony world Junction and Ejipura Main Road-Inner Ring Road Junction at Koramangala, Ward no-68, Bangalore. The primary objective of this investigation is to establish the geotechnical condition at the site and to evaluate the allowable bearing pressure and other engineering design parameters through the various field and laboratory tests. This report consists of the details about the field & Laboratory tests performed and the recommendations made based on the results of the tests.

2.0 SCOPE

Field work comprising drilling of 2 boreholes, conducting SPT tests and collection of samples started on 09.09.2011 and was completed on 18.09.2011. The primary objective of this investigation was to obtain information about the sub-surface conditions at the site and obtain net allowable bearing pressure for design of foundations. Fig 1: showing (client's reference drawing) the location of boreholes for the proposed construction site.

3.0 RELAVENT DESCRPTION OF PROJECT AREA

3.1 General Information about Project Site

The Proposed facility is a Grade separator by integrating Sony world junction and Ejipura main road-inner ring road junction located close to Koramangala.

3.2 Regional Geology

Geomorphologically, Bangalore district can be divided into rocky upland, plateau and flat topped Hills at an elevation of about 900m above MSL. A major part of district lies in Cauvery basin lies in Cauvery over an area of 5450 sq km covering nearly 68% of the total area. Major tributaries of Cauvery draining the district are Kanva, Shimsha and Arkavathy. Other rivers draining the remaining part of district are Pennar, Palar and Ponniyar. Soils of

Bangalore can be broadly classified into three categories (viz.) Loamy Soil, Lateritic Soil and Lateritic gravelly soil depending upon parent rocks in that area. These soils show wide variation in overburden thickness. Below Soil occurs weathered rock exhibiting varying degree of weathering with degree of weathering generally decreasing with depth. Further below, Bangalore urban and rural districts comprise of Precambrian crystalline formations comprising peninsular gneissic complexes with a small patch of hornblende schist in Northern part of District and intrusive Closepet granite all along the western parts of the district. Small stretch of unconsolidated sediments is noticed. The gneissic basement dates back to Archean Era (2500-3500 mya). A large granitic intrusion in south central Part of city extends from Golf Course to Vasantpur. Migmatitic intrusions are seen near Kanakpura Road. These basic intrusions constitute hard massive rocks such as dolerite, Gabbro, Norite and Pyroxenite.

3.3 Seismic Vulnerability

With regard to seismic vulnerability, the Project site is located in Karnataka which comes under zone II as per IS 1893 (Part I-2002). Recent earthquakes that occurred close to Bangalore were in the range of 2 to 5.5 in Richter scale. On January 29, 2001, earthquake magnitude of 4.3 in Richter scale hit in the Mandya area, with its epicenter about 35km south of Bangalore.

4.0 FIELD INVESTIGATION- RELEVANT DESCRIPTION

4.1 Boring and Drilling

Two boreholes of 150 mm/Nx diameter were sunk by deploying boring rigs using the conventional rotary drilling process. Methodology followed for boring confirmed to IS: 1892. Boring was effected by the cutting action of rotating bit and by stabilizing the sides of the boreholes by using casing pipes/bentonite slurry up to required depth to prevent side collapse. The boring was continued by normal boring process using MS soil cutter in borehole up to refusal stratum (N>100), Beyond this depth drilling was progressed using Nx size TC /Diamond bits. The borehole was terminated when adequate depth of drilling was completed in consultation with the Engineer-in-charge. **Refer Annexure I for Bore log.**

4.2 Standard Penetration Test (SPT) in boreholes

Standard Penetration Test (SPT) to determine penetration resistance was conducted in the boreholes using the procedure described in IS: 2131. In this method, driving bit is replaced by split spoon sampler (50.8 mm OD and 35 mm ID) and the sampler is driven by dropping 63.5 kg hammer on the top of the driving collar with a free fall of 75 cm. The length of the sampler is 60 cm. The sampler is first driven through 15 cm as "Seating Drive". It is further driven through 30 cm. The number of blows required to drive the sampler for 30 cm beyond seating drive is termed as "Penetration Resistance, N". Representative samples were collected using split spoon sampler. Where full 30cm penetration beyond seating drive was not possible, number of blows and corresponding penetration is mentioned in borelogs. ***Refer Annexure I for Borelog.***

4.3 Sampling in boreholes

In view of silt dominated/weathered rock/ rock formations prevalent, representative samples were collected from split spoon sampler used for conducting SPT at close intervals of 1.5m.

4.4 Ground water table

Water table was not met in any of the boreholes within explored depth below the existing ground level at the time of soil investigations; however the same may be subjected seasonal fluctuations.

5.0 SUB-SOIL PROFILE ANALYSIS

Layer – I

The sub soil consists of from top nil to 7.5m depth greyish brown to yellowish brown sandy Silt around BH-01 where as around BH-02 up to 12.0m depth greyish brown/whitish grey with yellowish grey sandy Silt with presence of mica is observed with N -Values ranges from 15 to 50 represents medium dense in nature. Around BH 1 filled up soil is observed to be 1.5m/2.0m depth.

Layer – II

This layer occurs immediately below soil Layer – I, the soil consist of yellowish brown/white to yellowish brown completely weathered rock is encountered up to 12.0m/13.50m depth with N- Values greater than 50 represents very dense in nature.

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Layer - III

This layer consists of moderately weathered rock around BH-01 up to termination depth with N-values >100 represent very dense strata where as around BH-02 up to termination depth grey hard rock is observed.

6.0 RECOMMENDATIONS FOR DESIGN OF FOUNDATIONS

1) The foundation for all structure shall be taken to a minimum depth of 1.5m below the proposed road level.

2) Net SBC Recommendations based on shear failure and allowable settlement of 25mm for isolated /combined footings having a minimum width of 3m is tabulated as under

Depth below the Natural ground level, m	Net SBC (kN/m^2)
1.5	160
3.0	200
4.5	250

Note 1: In case if water table/ change in strata are observed during foundation excavation, the same shall be brought to the Geotechnical Consultant notice for the review of recommended net SBC.

6.1 Alternative Foundation Recommendations

The following recommendations are made based on the soil investigation conducted and the conclusions drawn.

1. Bored cast-in-situ pile foundation is recommended based on load consideration. Piles shall be socketed into hard rock for at least 1.0 times the diameter of pile or 5 times the diameter in hard strata or weathered rock (with N>100).
2. For the design consideration (Design length of pile= 15.0m from existing ground) following allowable load carrying capacity of the piles may be considered.

Diameter, mm	Allowable Load, tones
750	180
900	300
1000	430

However actual load carrying capacity of pile may be arrived by conducting initial pile load test.

7.0 Other relevant Geo-technical Considerations

- Water table was not met in any of the boreholes within explored depth below the existing ground level at the time of soil investigations however the same may be subjected seasonal fluctuations. During execution, in case water is met, suitable dewatering measures shall be adopted to confine the water table to base level of the footing.
- The bottom of foundation shall be properly leveled and verified for loose pockets/weaker zones and if found, the same shall be replaced with lean concrete.

For GEOENGINEERING COMPANY PRIVATE LTD

GEO ENGINEERING CO. PVT. LTD. BANGALORE

(JAYAPRAKASH. K. N)

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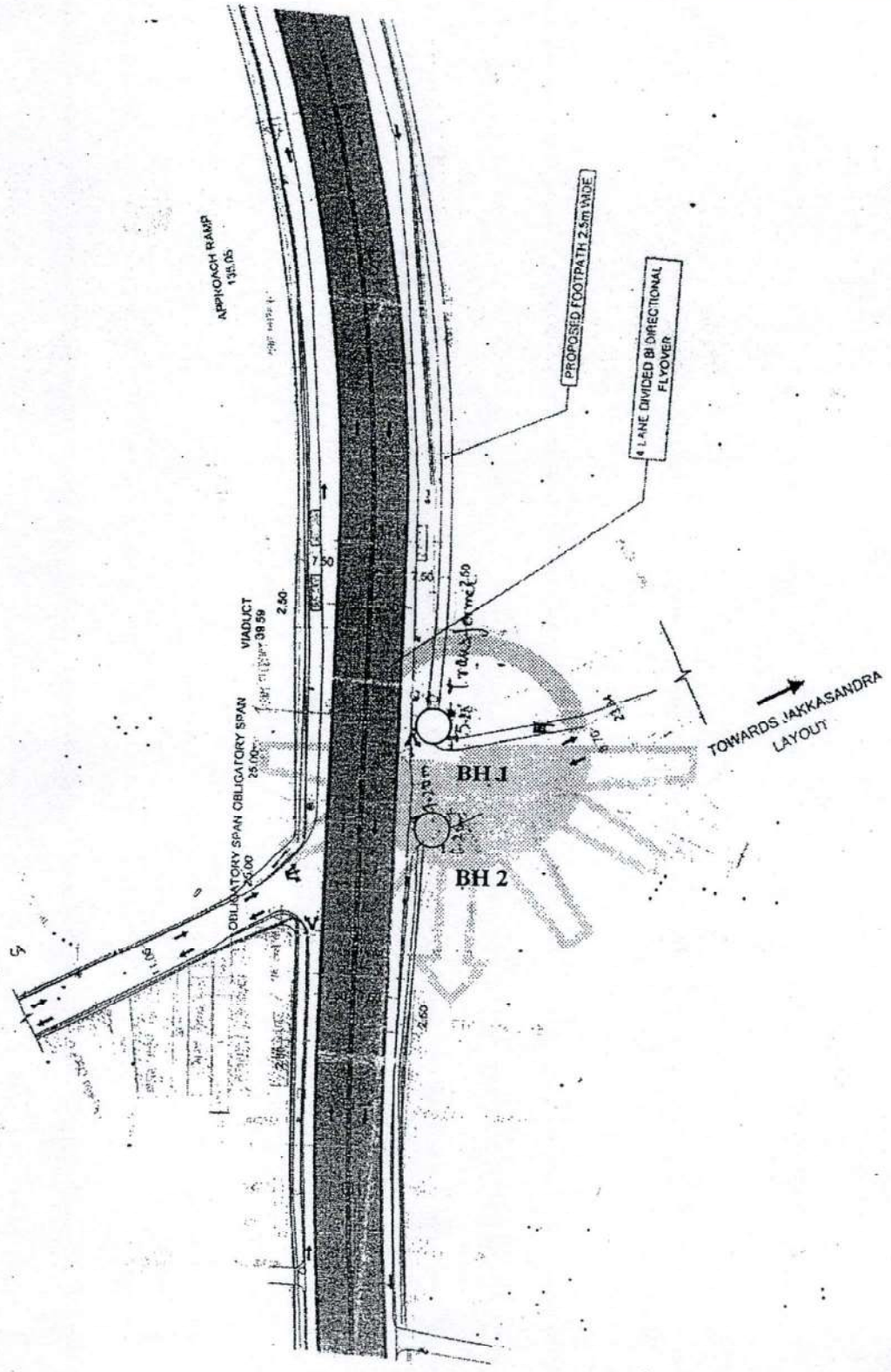

Fig 1: Location of Bore holes

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ANNEXURE I

ENGINEERING BORELOG

Client: BBMP
Borehole No : BH 1
Project : Grade Separator
Location : Ejipura Junction Point

Size of Borehole : 150mm/Nx Size
Ground water table (m) : Not met
Commenced : 09.09.11
Completed : 11.09.11

Description of Soil /Rock Stratum	Depth (m)	Legend	Sample	SPT TEST, number of blows recorded			N Value = N_2+N_3	Drilling in corable rock		Remarks
				1st 15cm	2nd 15cm	3rd 15cm		CR (%)	RQD (%)	
				N_1	N_2	N_3				
Filled up Soil	0.0 1.0 1.5 2.0		SPT	4	4	6	10			
Brown clayey Silt with presence of clay binder	2.5 3.0		SPT	12	15	22	37			
White to yellowish grey silty Sand	3.5 4.0 4.5		SPT	38	5cm	R	>100			Localized pocket
Greyish brown/yellowish brown sandy Silt	5.0 5.5 6.0 6.5 7.0 7.5		SPT SPT	15 17	18 21	21 24	39 45			
Yellowish brown/grey to yellowish brown weathered rock	8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0		SPT SPT SPT	20 16 15	20 28 40/8cm	25 36 R	45 64 >100			
Yellowish brown coarse Sand	12.5 13.0 13.5		WS							Washed samples collected
Whitish grey moderately weathered rock	14.0 14.5 15.0 15.5 16.0 16.5 17.0 17.5 18.0 18.5 19.0 19.5 20.0		CR CR CR CR					26 11 17 11	26 NIL 17 11	

SPT=Standard penetration test
UDS= Undisturbed Sample
RQD= Roack Quality Designation
R= Refusal /Rebound
CR=Core Recovery

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ENGINEERING BORELOG

Client: BBMP
Borehole No : BH 2
Project : Grade Separator
Location : Ejipura Junction Point

Size of Borehole : 150mm/Nx Size
Ground water table (m) : Not met
Commenced : 14.09.11
Completed : 18.09.11

Description of Soil /Rock Stratum	Depth (m)	Legend	Sample	SPT TEST, number of blows recorded			N Value = N_2+N_3	Drilling in corable rock		Remarks
				1st 15cm	2nd 15cm	3rd 15cm		CR (%)	RQD (%)	
				N_1	N_2	N_3				
Brown sandy Silt	0.0 0.5									
Yellowish brown coarse Sand	1.0 1.5		SPT	9	12	13	25			
Greyish brown/whitish grey sandy Silt	2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0		SPT SPT SPT	10 14 18	13 17 21	16 19 25	29 36 46			
Yellowish grey sandy Siltsilty Sand with presence of mica	6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0		SPT SPT SPT SPT	19 28 26 >50	23 R 31 R	26 R	49 >100 >100 >100			
Greyish white moderately weathered rock	12.5 13.0 13.5 14.0		CR					44	NIL	
Grey Hard rock	14.5 15.0 15.5 16.0		CR					70	64	

SPT=Standard penetration test
UDS= Undisturbed Sample
RQD= Roack Quality Designation
R= Refusal /Rebound
CR=Core Recovery

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ANNEXURE II

TABLE No.1: LABORATORY TEST RESULTS

BH No.	Depth (m)	Sample	Grain size analysis (%)					Atterberg's Limits (%)		NMC (%)
			G	CS	MS	FS	Silt and clay	LL	PL	
1	3.0	SPT	0.0	1.0	19.0	26.5	53.6	--	--	17.3
	6.0	SPT	0.6	1.0	23.8	17.8	56.7	41.3	--	20.4
	7.5	SPT	0.0	0.7	22.6	15.8	61	--	--	22.1
	9.0	SPT	0.8	2.4	23.8	19.3	53.8	--	--	16.5
	12.0	SPT	1.0	2.3	23.4	16.3	57.1	--	--	20.7
2	1.5	SPT	3.4	14.9	72.3	6.9	2.4	--	--	12.1
	4.5	SPT	1.4	6.2	32.5	18.3	41.6	42.6	44.6	16.6
	6.0	SPT	0.6	4.2	30.5	16.3	48.5	--	--	20.9
	9.0	SPT	0.1	2.1	32.8	23.9	41.2	--	--	13.5
	10.5	SPT	0.0	0.9	27.9	20.4	50.8	--	--	16.6
	12.0	SPT	0.0	3	46.5	21.2	29.2	--	--	13.4

All depths of sampling and testing are below existing level

G - Gravel, CS- Coarse sand, MS-Medium Sand, FS-Fine Sand,

NMC –Natural moisture content, NP- Non-plastic

LL - Liquid Limit, PL-Plastic Limit

Idealized testing done based on extensive visual classification and repetitive testing avoided

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GRAIN SIZE ANALYSIS CURVES

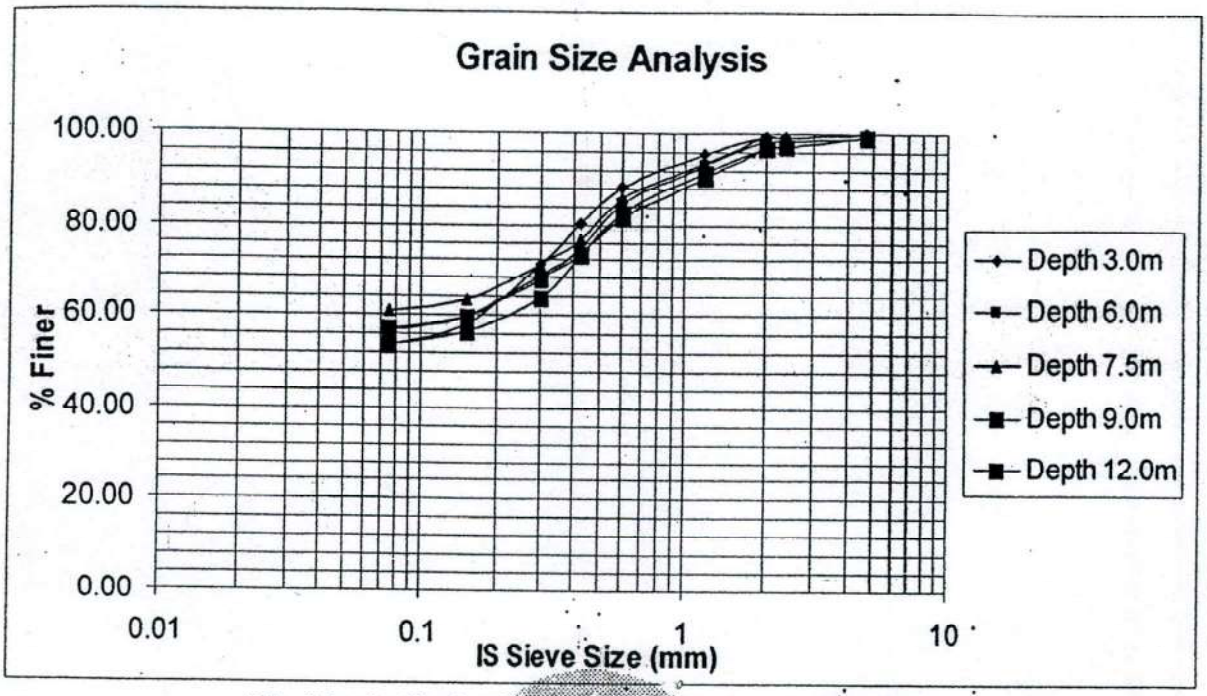

Fig. No. 2: Grain size analysis Curves around BH 1.

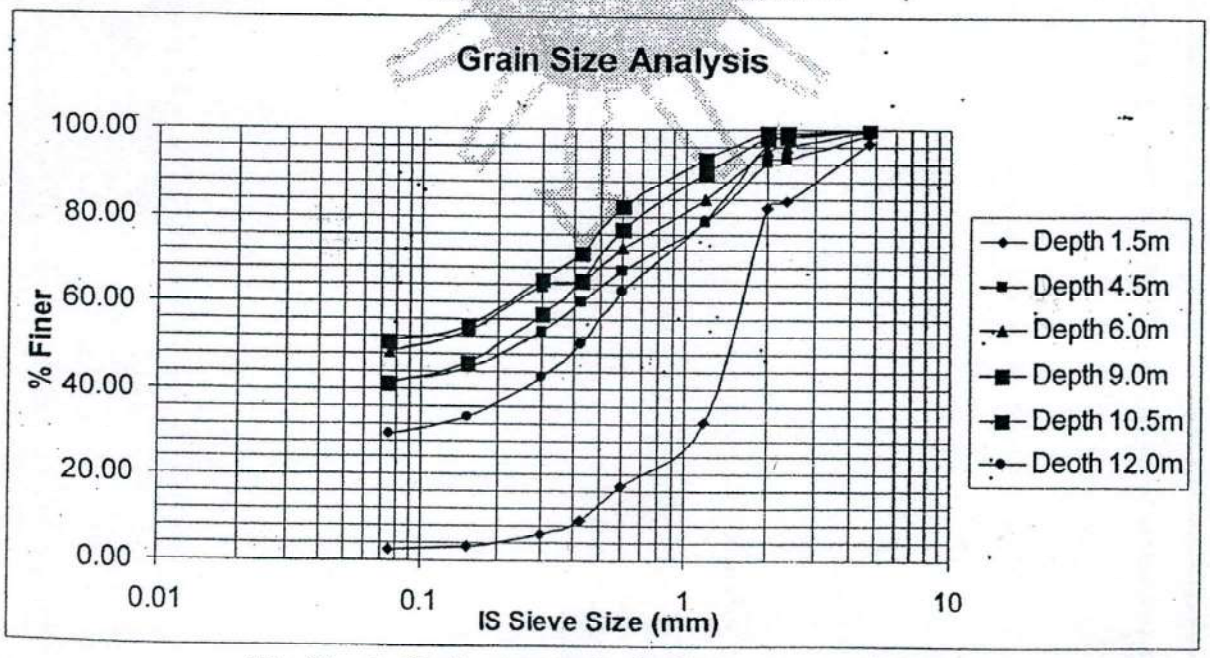

Fig. No. 3: Grain size analysis Curves around BH 2.

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Design of a Pile Foundation - Single Pile

Piles in Cohesion less Soils

Diameter of Pile, D =		900	mm	=	0.9	m
Length of Pile, L =		15	m			
S. Density of soil at pile tip, r =	Assumed	0.8	g/cc	=	8	kN/m^3
Angle of internal friction at pile tip =		40	degrees			

Nr = 109 (from IS 6403 for the given phi value)
Nq = 125 (from IS 2911 for the given phi value)

Ap = 0.6359 m^2

Ultimate Bearing Capacity, Qu = Qus + Qup

Qup = Ap (1/2 * D * r * Nr + P_D * Nq) = 7243.86 kN
Qus =Sum (K * P_{Di} tan(delta) * Asi) = 365.91 kN

Qu = 7609.77 kN

Factor of Safety = 2.5
Qua = 3043.9 kN
304.39 Tone

Sony World Junction

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ವಿಬೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

REPORT

ON

THE GEOTECHNICAL INVESTIGATION FOR THE PROPOSED GRADE SEPARATOR AT THE JUNCTION OF 100 FEET INNER RING ROAD - KORAMANGALA IN WARD NO: 68, BANGALORE

CLIENT: **M/s. Manasa Consultants,**
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REPORT NO: 060308 - 422

REPORT ON THE GEOTECHNICAL INVESTIGATION FOR THE PROPOSED GRADE SEPARATOR AT THE JUNCTION OF 100 FEET INNER RING ROAD, KORAMANGALA IN WARD NO: 68, BANGALORE

INTRODUCTION

M/s. Manasa Consultants, Bangalore has entrusted us to carry out the geotechnical investigation for the proposed grade separator at the junction of 100 feet inner ring road-Koramangala in ward No: 68, Bangalore The primary objective of this investigation was to establish the ground condition at the site and evaluating the bearing pressure and other engineering design parameters through the field and laboratory tests. This report consists of the details about the field tests performed and the recommendations made based on the results of the tests.

SCOPE

The scope of work includes both the field tests and laboratory tests. Four boreholes by mechanical drilling method are planned at location to obtain the sub-surface stratification. Fig.1 shows the location of the boreholes on the entire plan of the proposed construction site.

FIELD INVESTIGATION

The field investigation consists of advancing 150mm dia boreholes using rotary drilling with bentonite mud circulation. Standard penetration test (SPT) was conducted at every 1.50m interval as per IS: 2131 – 1981. The number of blows for 30cm penetration of split spoon sampler was recorded as N-values. 100mm dia undisturbed samples (UDS) were collected at intermediate depths using thin walled tube samplers as per IS 2132. The process of drilling, conducting SPT and collecting UDS were continued up to refusal stratum (N>50), Beyond this depth drilling was progressed using NX size TC/diamond bits. The boreholes were terminated when adequate depth of drilling was completed in consultation with the Engineer-in-charge.

The various sub-surface strata are presented in the respective bore charts.

LABORATORY TESTS

Laboratory Test was performed to evaluate both the index and engineering properties of the soil samples collected during boring. The different tests performed are test for Grain size

Distribution, Atterberg limits and direct shear test. The results of these tests are presented in Table 1 to 4.

SUB SOIL PROFILE

The subsoil generally consists of top nil to 1.5m is filled up soil followed by yellowish to brownish medium to fine sandy Clay up to 4.5m depth below this there is greyish yellow weathered rock up to 19.5m around BH 1 and BH 3 whereas around BH 2 and BH 4 there is greyish white weathered rock up 6.0m depth beyond this there is greyish white hard rock up to termination depth. All the boreholes are terminated at an average depth of 15.0m depth from the existing ground level. During the time of investigation water table was encountered at an average depth of 4.0m from the existing ground level.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The following conclusions and recommendations are given based on field and laboratory investigations.

1. The soil stratum up to 6.0m is found to be medium stiff in nature.
2. The soil stratum below 6.0m is found to be very dense in nature.
3. The silt presence in the soil is found to be medium compressible in nature.
4. The silt presence in the soil is found to be very stiff in consistency and medium plastic in nature.
5. During the time of investigation water table was encountered at an average depth of 4.0m from the existing ground level.
6. During the time of investigation ground water table was not encountered up to termination depth.

RECOMMENDATIONS

The following recommendations are made based on the detailed investigation conducted and the conclusions drawn.

1. The foundation for all structure shall be taken to a minimum depth of 1.50m below the existing ground level.

2. Individual footing/combined footing may be designed with the following allowable bearing pressure of, which gives a factor of safety of 3.0 against shear failure and for an allowable settlement of 25mm.

Depth, m	S.B.C (t/m^2)
1.5	12
3.0	17
4.5	22

3. Provide 100mm down size well graded aggregates well compacted to 8" depth followed by 4" sand cushion at founding level.

4. The bottom of foundation shall be properly leveled and verified for loose pockets/weaker zones and if found, the same shall be replaced with lean concrete.

Alternatively

1. Bored cast-in-situ pile foundation is recommended based on load consideration. Piles shall be socketed into hard rock for at least 0.6 times the diameter of pile or 5 times the diameter in hard strata or weathered rock.

2. In cases of pile founded in a hard stratum the spacing will be governed by the competency of end bearing strata. The minimum spacing in such cases, shall be 2.5times the diameter of the shaft. In case pile resting on hard rock 2 times the diameter may be adopted.

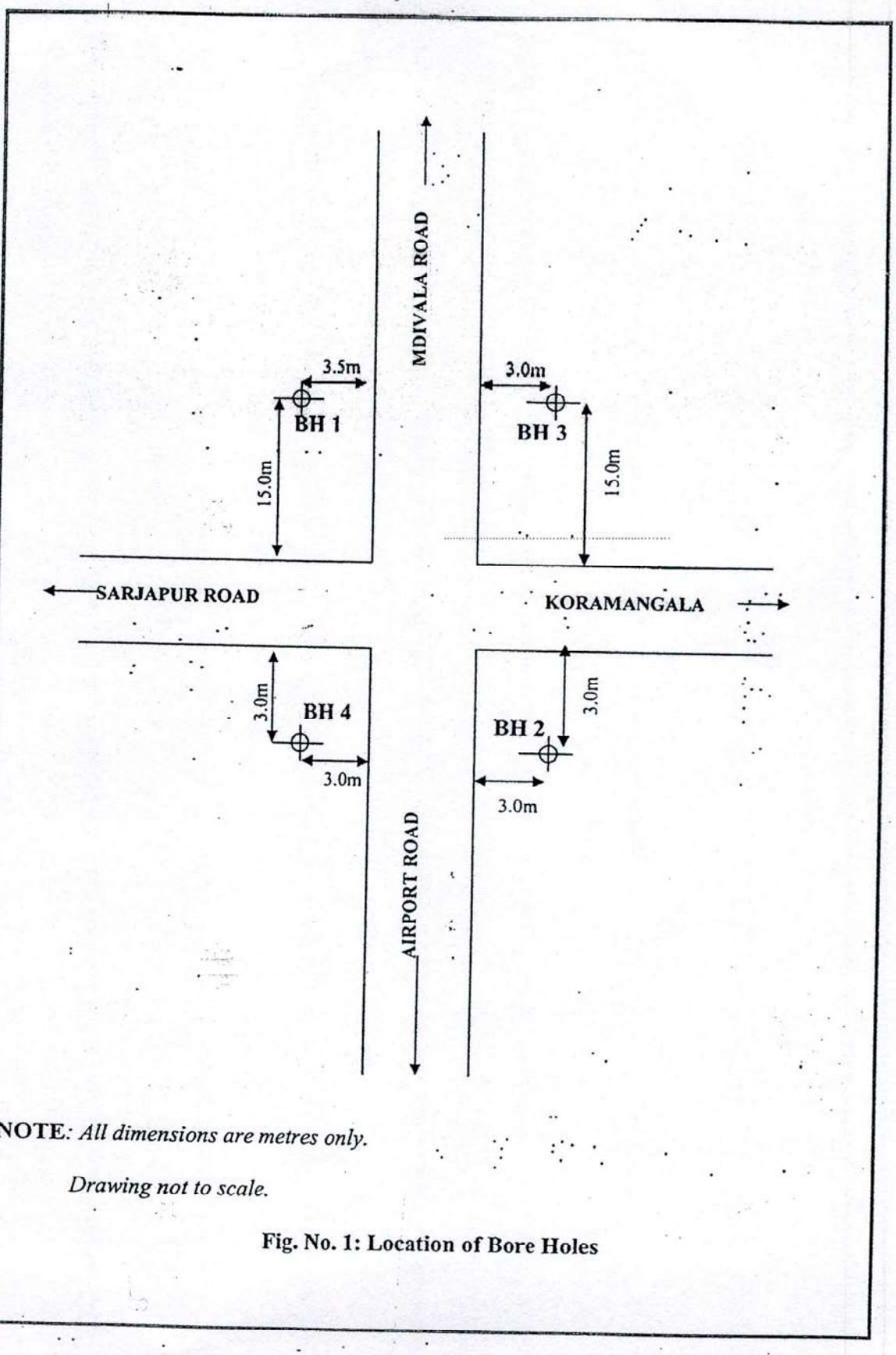
3. Piles deriving their bearing capacity mainly from the friction shall be sufficiently apart to ensure that the zones of soils from which piles derive their support do not overlap to such an extent that their bearing values are reduced. Generally spacing in such cases shall not be less than three times the diameter of the shaft.

4. For the design consideration (Design length of pile= 15.0m from existing ground) following allowable load carrying capacity of the piles may be considered. However actual load carrying capacity of pile may be arrived by conducting initial pile load test.

Diameter, mm	Allowable Load, tones
600	75
750	175
1000	380

for GEOENGINEERING COMPANY PRIVATE LTD

(JAYAPRAKASH. K. N)



NOTE: *All dimensions are metres only.*

Drawing not to scale.

Fig. No. 1: Location of Bore Holes

*Geo Engineering Company Private **Limited**, Bangalore.*

BORE HOLE NUMBER: 1

Site: Koramangala

Date of testing: 06/03/08

Type of Boring: Rotary Drilling

Borehole diameter: 150 mm

GWT: 2.0 m

DESCRIPTION	Legend	Depth (m)	Sample	N - Value	SPT Test Results No. of blows N/30 cms
					10 20 30 40 50
		0.0	--	--	
Filled up Soil		1.0	DS	--	
Yellowish clayey fine Sand		1.5	SPT UDS	02	
		3.0	SPT DS	13	
Yellowish medium to fine sandy Clay		4.5	SPT DS	16	
		5.5	DS	--	
		6.0	SPT DS	22	
Greyish yellow clayey fine to medium Sand		7.5	SPT DS	>50	
		9.0	SPT DS	>100	
Yellowish weathered rock		10.5	DS	--	

SPT – Standard Penetration Test

UDS – Undisturbed soil sample

DS – Disturbed soil Sample

GWT – Ground Water Table

Fig. 2: Bore log at BH: 1

BORE HOLE NUMBER: 1 (Contd...)

Site: Koramangala

Date of testing: 06/03/08

Type of Boring: Rotary Drilling

Borehole diameter: 150 mm

GWT: 2.0 m

DESCRIPTION	Legend	Depth (m)	Sample	N - Value	SPT Test Results No. of blows N/30 cms 10	20	30	40	50
		10.5	DS	--					
		12.0	DS	--					
		13.5	DS	--					
Whitish grey weathered rock		15.0	DS	--					
		16.5	DS	--					
		18.0	DS	--					
		19.5	DS	--					
Whitish yellow soft Rock		20.0	C.R	--					

Run, m	C.R, %	R.Q.D,%
19.5 to 20.0	20	Nil

SPT – Standard Penetration Test

DS – Disturbed soil Sample

C.R – Core Recovery

UDS – Undisturbed soil sample

GWT – Ground Water Table

RQD – Rock Quality Designation

Fig. 3: Bore log at BH: 1

BORE HOLE NUMBER: 2

Site: Koramangala — Date of testing: 10/03/08

Type of Boring: Rotary Drilling — Borehole diameter: 150 mm

GWT: Nil

DESCRIPTION	Legend	Depth (m)	Sample	N - Value	SPT Test Results No. of blows N/30 cms
					10 20 30 40 50
		0.0	--	--	
Filled up Soil					
		3.0	UDS	--	
Brownish grey medium to fine sandy Clay		4.5	SPT DS	25	
		6.0	SPT DS	40	
Greyish white weathered rock		6.3	DS	>100	
		6.7	--	--	
Greyish white hard rock					
		7.9	C.R	--	

Run, m	C.R, %	R.Q.D,%
6.7 to 7.9	100	100

SPT – Standard Penetration Test — UDS – Undisturbed soil sample

DS – Disturbed soil Sample — GWT – Ground Water Table

C.R – Core Recovery — RQD – Rock Quality Designation

Fig. 4: Bore log at BH: 2

BORE HOLE NUMBER: 3

Site: Koramangala — Date of testing: 06/03/08

Type of Boring: Rotary Drilling — Borehole diameter: 150 mm

GWT: 2.0 m

DESCRIPTION	Legend	Depth (m)	Sample	N - Value	SPT Test Results No. of blows N/30 cms
					10 20 30 40 50
		0.0	--	--	
Filled up Soil					
		1.0	DS	--	
Yellowish clayey fine Sand					
		1.5	SPT	05	
			UDS		
		3.0	SPT	16	
Yellowish medium to fine sandy Clay			DS		
		4.5	SPT	21	
			DS		
		5.5	DS	--	
		6.0	SPT	31	
Greyish yellow clayey fine to medium Sand			DS		
		7.5	SPT	>50	
			DS		
Yellowish weathered rock		9.0	DS	--	
		10.5	DS	--	

SPT – Standard Penetration Test — UDS – Undisturbed soil sample

DS – Disturbed soil Sample — GWT – Ground Water Table

Fig. 5: Bore log at BH: 3

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BORE HOLE NUMBER: 3 (Contd...)

Site: Koramangala

Date of testing: 06/03/08

Type of Boring: Rotary Drilling

Borehole diameter: 150 mm

GWT: 2.0 m

DESCRIPTION	Legend	Depth (m)	Sample	N - Value	SPT Test Results No. of blows N/30 cms				
					10	20	30	40	50
		10.5	DS	--					
		12.0	DS	--					
		13.5	DS	--					
Whitish grey weathered rock		15.0	DS	--					
		16.5	DS	--					
		18.0	DS	--					
		19.5	DS	--					
		20.0	DS	--					

SPT – Standard Penetration Test

UDS – Undisturbed soil sample

DS – Disturbed soil Sample

GWT – Ground Water Table

C.R – Core Recovery

RQD – Rock Quality Designation

Fig. 6: Bore log at BH: 3

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BORE HOLE NUMBER: 4

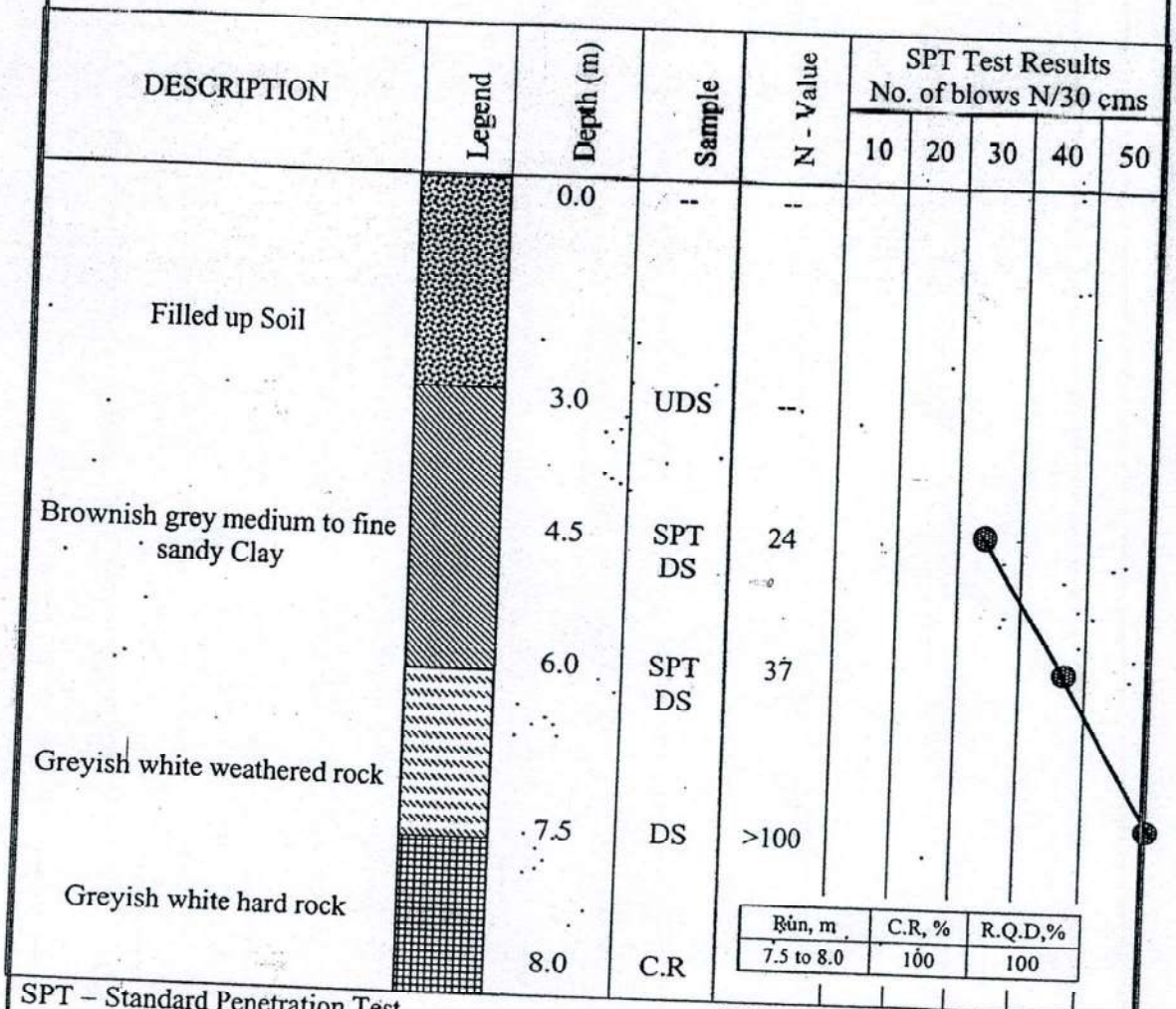
Site: Koramangala

Date of testing: 10/03/08

Type of Boring: Rotary Drilling

Borehole diameter: 150 mm

GWT: Nil



SPT – Standard Penetration Test

DS – Disturbed soil Sample

C.R – Core Recovery

UDS – Undisturbed soil sample

GWT – Ground Water Table

RQD – Rock Quality Designation

Fig. 7: Bore log at BH: 4

TABLE NO: 1 (BH 1)

Depth (m)		1.5	3.0	4.5	6.0
Dry Density (g/cc)		1.59	--	--	--
Water Content (%)		13.5	14.3	15.8	10.9
Liquid Limit (%)		33.3	33.3	--	32.0
Plastic Limit (%)		16.3	17.9	--	18.2
Grain size Distribution Gravel (%)		2.6	0.0	0.3	2.6
Sand (%)	Coarse	2.5	0.9	1.9	6.8
	Medium	20.0	22.9	18.2	45.1
	Fine	26.7	25.4	23.4	24.6
Silt & Clay		48.0	50.8	56.2	21.0
Shear test	C, (kg/cm^2)	0.11	--	--	--
	ϕ, (deg)	26	--	--	--

TABLE NO: 2 (BH 2)

Depth (m)		3.0	4.5	6.0
Dry Density (g/cc)		1.51	--	--
Water Content (%)		26.9	26.9	7.7
Liquid Limit (%)		33.6	33.2	--
Plastic Limit (%)		18.2	18.7	--
Grain size Distribution Gravel (%)		0.0	0.0	5.9
Sand (%)	Coarse	0.1	0.1	21.4
	Medium	3.2	3.3	42.8
	Fine	8.0	10.0	18.5
Silt & Clay		88.7	86.7	11.4
Shear test	C, (kg/cm^2)	0.12	--	--
	ϕ, (deg)	27	--	--

TABLE NO: 3 (BH 3)

Depth (m)		1.5	3.0	4.5	6.0
Dry Density (g/cc)		1.59	--	--	--
Water Content (%)		12.9	14.9	15.2	11.3
Liquid Limit (%)		32.3	34.6	--	31.5
Plastic Limit (%)		15.6	16.3	--	16.3
Grain size Distribution Gravel (%)		2.1	0.0	0.4	3.2
Sand (%)	Coarse	2.9	0.3	1.7	5.8
	Medium	21.3	23.1	19.6	44.6
	Fine	25.6	24.3	24.3	23.7
Silt & Clay		48.1	52.3	54.0	22.7
Shear test	C, (kg/cm^2)	0.11	--	--	--
	ϕ, (deg)	28	--	--	--

TABLE NO: 4 (BH 4)

Depth (m)		3.0	4.5	6.0
Dry Density (g/cc)		1.53	--	--
Water Content (%)		23.6	22.3	8.9
Liquid Limit (%)		32.3	31.6	--
Plastic Limit (%)		18.2	19.3	--
Grain size Distribution Gravel (%)		0.0	0.0	6.6
Sand (%)	Coarse	0.2	0.6	22.3
	Medium	4.2	5.2	33.4
	Fine	12.3	13.8	19.6
Silt & Clay		83.3	80.4	18.1
Shear test	C, (kg/cm^2)	0.12	--	--
	ϕ, (deg)	26	--	--

SBC Specimen Calculation

Depth of footing = 3.0m

Width of footing = 2.0m

Based on Shear Failure Criterion (Ref - IS 6403 – 1981):

Net safe bearing capacity, $q_{ns} = (cN_cS_cd_ci_c + q(N_q-1)S_qd_qi_q + 0.5B\gamma N_\gamma S_\gamma d_\gamma i_\gamma) / F.S.$

Where, N_c, N_q, N_γ are the bearing capacity factors,

S_c, S_q, S_γ are shape factors,

d_c, d_q, d_γ are depth factors and

i_c, i_q , i_γ are inclination factors.

Water table is assumed at the base of the footing

Assuming Local Shear Failure:

For $\phi = 26°, \phi' = 18$, $N_c = 13.3$, $N_q = 5.4$ and $N_\gamma = 4.3$

For a square footing, $S_c = 1.3$, $S_q = 1.2$ and $S_\gamma = 0.8$

For a depth of 3.0m, $dc = 1 + 0.2 (D_f / B) \tan (45+\phi /2) = 1.41$

$$d_q = d_\gamma = 1 + 0.1 (D_f / B) \tan(45+\phi /2) = 1.21$$

For vertical loading, $i_c = i_q = i_\gamma = 1.0$

Assuming a density of 18.3kN/m^2 and a factor of safety of 3.0,

$$q_{ns} = 134.3 \text{ kN/m}^2 = 13.4 \text{ t/m}^2$$

Based on Settlement Criterion (Ref - IS 8009 (Part I) - 1976)

For Average N = 21 below the base of foundation to 1.5 times the width of foundation, and width = 2.0m, from Fig.9 of IS 8009, settlement = 0.012m under a pressure of 1 kg/cm^2. Hence, for a permissible settlement of 25 mm, safe bearing pressure = 2.08 kg/cm^2 = 20 t/m^2. Hence, safe bearing capacity = **17 t/m^2** for a footing of width 2.0m at a depth of 3.0m has to be adopted.

Design of a Pile Foundation - Single Pile

Piles in Cohesionless Soils

Diameter of Pile, D =	1000	mm	=	1	m
Length of Pile, L =	15	m			
S.Density of soil at pile tip, r =	1	g/cc	=	10	kN/m^3
Angle of internal friction at pile tip =	40	degrees			

Nr = 130 (from IS 6403 for the given phi value)

Nq = 109.41 (from IS 2911 for the given phi value)

Ap = 0.7850 m^2

Ultimate Bearing Capacity, Qu = Qus + Qup

Qup = Ap (1/2 * D * r * Nr + P_D * Nq)

= 10816.67 kN

Qus =Sum (K * P_{Di} tan(delta) * Asi) = 394.27 kN

Qu = 11210.95 kN

Factor of Safety = 3

Qua = 3737.0 kN

373.70 Tonne

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CHAPTER 6
CORRIDOR IMPROVEMENT SCHEME

6.1 General

The Proposal for Corridor Improvement Scheme includes Junction Improvements by proposing Elevated Corridor by integrating Major Junctions like Ejipura Main Road – Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along with one Up Ramp and one Down Ramp at Kendriya Sadana Junction; Widening of existing Carriageway; Link Improvements such as Provision of Footpath, Pedestrian Crossing Facilities; Construction of Drain; Upgradation of Utilities; Improvement to existing Culvert over Storm Water Drain; Provision of Effective Illumination; Lane Marking; Provision of Studs and Delineators; etc.

The Concept of Elevated Corridor proposed along 100ft. Inner Ring Road is briefly explained below.

6.2 Elevated Corridor along 100ft. Inner Ring Road

4 lanes divided bi directional Elevated Corridor has been proposed along 100ft. Inner Ring Road by integrating Major Junctions like Ejipura Main Road – Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along with one Up Ramp and one Down Ramp at Kendriya Sadana Junction. Slip Road of 10.5m Width and Footpath of minimum Width 2.5m have been proposed on either side at Grade Level. Obligatory Spans of various dimensions based on the existing Site Conditions have been proposed at Ejipura Main Road – Inner Ring Road Junction, Sony World Junction, Koramangala 8th Main Road Junction, Koramangala 60ft. Road Junction, Koramangala 5th Block 1A Cross Road Junction, Koramangala BDA Complex Junction and Kendriya Sadana Junction to take care of the Vehicle Turning Movements at Grade. The Salient Features of the Elevated Corridor along 100ft. Inner Ring Road are given below.

• Length of Elevated Corridor	2405.64m
• Number of Lane	4 lanes divided bi directional
• Carriageway Width	2 X 7.5m
• Vertical Clearance	Minimum 5.5m
• Vertical Gradient	Maximum 5% (1 in 20)
• Length of Obligatory Span	
At Ejipura Main Road – Inner Ring Road Junction	2 Nos. of 25m each
Near Storm Water Drain	28.15m
At Sony World Junction	30m
At Koramangala 8th Main Road Junction	30m
At Koramangala 60ft. Road Junction	30m
At Koramangala 5th Block 1A Cross Road Junction	30m
At Koramangala BDA Complex Junction	30m
At Kendriya Sadana Junction	
Along 100ft. Inner Ring Road	40m
Near Up Ramp	40m
Near Down Ramp	40m

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- Length of RCC Viaduct

Towards Domlur	50m
Between Ejipura Junction and Storm Water Drain	409.40m
Between Storm Water Drain and Sony World Junction	184.23m
Between Sony World Junction and Koramangala 8th Main Road Junction	325.27m
Between Koramangala 8th Main Road Junction and Koramangala 60ft. Road Junction	65.06m
Between Koramangala 60ft. Road Junction and Koramangala 5th Block 1A Cross Road Junction	107.50m
Between Koramangala 5th Block 1A Cross Road Junction and Koramangala BDA Complex Junction	197.81m
Between Koramangala BDA Complex Junction and Kendriya Sadana Junction	437.14m
Towards Hosur Road	50m

- Length of Solid Ramp

Towards Domlur	118.62m
Towards Hosur Road	192.46m
From Hosur Road – Sarjapur Road Junction	164.74m
Towards Sarjapur Road – Madiwala Road Junction	169.21m

- Width of Slip Road

Along 100ft. Inner Ring Road on either side at Grade Level (Between Hosur Road Junction and Kendriya Sadana Junction)	7.5m
Along 100ft. Inner Ring Road on either side at Grade Level (Between Kendriya Sadana Junction and Ejipura Junction)	10.5m
Along Sarjapur Road on either side at Grade Level	10.5m

- Width of Footpath on either side at Grade Level — Minimum 2.5m
- Land Acquisition — 4819.257 Sqm

General Arrangement Drawings along with Longitudinal Section of the Elevated Corridor are given in **Drawing No. MC / BBMP / 2618 / ELC – IRR / GAD / 103A, Drawing No. MC / BBMP / 2618 / ELC – IRR / GAD / 103B, Drawing No. MC / BBMP / 2618 / ELC – IRR / GAD / 103C, Drawing No. MC / BBMP / 2618 / ELC – IRR / GAD / 103D, Drawing No. MC / BBMP / 2618 / ELC – IRR / GAD / 103E** and **Drawing No. MC / BBMP / 2618 / ELC – IRR / GAD / 103F** respectively.

At Grade Plans are given in **Drawing No. MC / BBMP / 2618 / ELC – IRR / ATGP / 104A, Drawing No. MC / BBMP / 2618 / ELC – IRR / ATGP / 104B, Drawing No. MC / BBMP / 2618 / ELC – IRR / ATGP / 104C** and **Drawing No. MC / BBMP / 2618 / ELC – IRR / ATGP / 104D** respectively.

Cross Section Details of the Elevated Corridor at different Obligatory Spans and Standard Span are given in **Drawing No. MC / BBMP / 2618 / ELC – IRR / CS / 105A** and **Drawing No. MC / BBMP / 2618 / ELC – IRR / CS / 105B** respectively.

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Land Acquisition Details are given in **Drawing No. MC / BBMP / 2618 / ELC – IRR / LAD / 106A**, **Drawing No. MC / BBMP / 2618 / ELC – IRR / LAD / 106B** and **Drawing No. MC / BBMP / 2618 / ELC – IRR / LAD / 106C** respectively.

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Chapter – 7

Design of Elevated Corridor

CHAPTER 7
DESIGN OF ELEVATED CORRIDOR

7.1 Planning and Investigations

The Corridor Improvement Scheme has been discussed in detail in Chapter 6. The Project Stretch is located in one of the thickly developed areas of Bangalore City and has several numbers of Underground Services like Water, Sewer, Electricity, etc. and diverting these Service Lines are very challenging. Further, Diversion of the Underground Services like Water, Sewer, Electricity, etc., which will affect the Construction Activities will be programmed prior to the Excavation Work.

7.2 General Arrangement

Care has been taken while designing so that the Structure generally fulfills the following requirements.

- The Soundness of the Structure and its Durability are of the highest standards.
- Aesthetics is in harmony with the surroundings.
- Speedy and Practicable Construction.
- Economy in Construction.

7.3 Design Loads

1. Live Load

Grade Separator has been designed for as per the Provisions given in IRC: 6.

2. Wind Force

Wind Forces have been considered as per the Provisions given in IRC: 6.

The Appropriate Wind Force on 10m high Lighting Pole @ 30 m c / c has been considered in the Design.

3. Seismic Force

The Grade Separator has been designed for the Seismic Force as per the Provisions given in IRC: 6.

4. Earth pressure

- The Soil Properties for Embankment like Dry Density of Soil 1.85 t / cum.; Saturated Density 2.00 t / cum.; $\Phi = 30^0$ and c = 0 have been considered for Estimation Purpose.
- Saturated Density of the Backfill (minimum 2 t / cum) has been considered for calculating Active Earth Pressure for Estimation Purpose.

5. Temperature Range

- For Design of Structure, to account for temperature, the following Formula has been considered.

(DL) = αLt,

The value of "t" shall be ±17°C.

Where α = Coefficient of expansion or contraction

L = Length of the member

(DL) = Expansion / Contraction due to Temperature Variation in appropriate units.

The Superstructure has been designed for Effects of Distribution of Temperature across the Deck Depth as per the relevant Codal Provisions. For Calculation, Thermal Force Effect (E) of 50% of the Insulation Value has been considered so that to account for Effect of Creep on Thermal Strain.

7.4 Design of Elevated Corridor

7.4.1 General

The Length of the Elevated Corridor has been determined by the depth of the superstructure of the Obligatory Span, where a minimum vertical clearance of 5.5m has to be provided. The Roads in the Project Area have a number of Underground Services like Water, Sewer, Electricity, etc. and diverting these Service Lines are not so easy and hence the Foundation has been designed in such a way that there will be minimum obstruction for executing the work. Hence, Open Foundation, though economical is not considered, as it requires Shoring as well as Temporary Support to Service Lines in addition to Prolonged Time of Construction.

The Depth of Pile has been taken as 15m in the Cost Estimate upon the Cut off Level. The Boreholes shall be taken at the Time of Execution one at each Pier prior to the Commencement of the Work. The Termination Level of the Borehole shall be determined by conducting SPT Tests. Three consecutive SPT Tests at an interval of 1.5m each with 'N' Values greater than 100 shall be carried out before Termination. If Rock is encountered, Drilling shall continue upto 3m in Rock with Rock Samples taken for Testing. All the Soil / Sub Soil Investigations shall be strictly in accordance with the Relevant Code Provisions.

While checking the Stresses at the Base of Foundations it has to be ensured that under the Worst Combination of Forces no Tension is permitted. The Safe Bearing Capacity at the Foundation Level shall be verified during Construction so that to ensure that the Stresses imposed on the Foundation Strata are within Permissible Limits.

7.4.2 Foundation

With the Presence of Underground Services and Foundation of adjoining Existing Structures, Open Foundation is not permitted considering the Time for Execution, Importance from Traffic Point of View and Location of the Elevated Corridor. Pile Foundation is considered for Speedy Construction and Minimum Traffic Disruption. As far as possible, the Piles will be installed by bypassing the Underground Services and the Piles Caps will be constructed below the Ground Level at a minimum depth of 0.75m form the Surface. The Piles are of Bored Cast – in – Situ Type and resting on Hard Strata,

where 'N' Values are more than 100. The Construction of Pile Foundation Design has been done as per the Relevant Specifications of IS: 2911.

The Piles are essentially End Bearing and are socketed into the Hard Strata at least to a Depth equal to 1.5 times the Diameter of the Pile. The Presence of Hard Strata shall be established by conducting SPT Tests in the Pile Bore. On ascertaining the Hard Strata through SPT, further Chiseling shall be done for Socketing. The Number of Drops of a given Chisel falling at a constant fall for a Specific Depth of Penetration shall be noted and these Chiseling Criteria (in terms of Number of Drops) shall be used to ascertain Hard Strata in the surrounding bores. Based on the available Soil Data for the area, a Pile Length of 15m has been assumed for the Purpose of Cost Estimation. The Capacity has to be derived by working out the Actual Load Capacity of a laterally supported, free standing Column. However, the Construction Agency shall submit the Design Calculation for Pile Load Capacity to the Engineer on the Basis of the Results of Initial Load Test on Piles. The Test Piles shall be installed as directed by the Engineer.

Metal Casings with Thickness not less then 6mm has been proposed to support the unstable sides at the Top of the Borehole.

- **Minimum Length of the Embedment**

  A minimum Depth of Embedment of 9m (including Socket Length) in Soil has been proposed to be maintained where the Pile cannot be driven any further. However, the Termination Level of the Pile shall be as per specific Instructions of the Engineer – in – Charge or his Authorized Representative. In the event of Presence of Rock or very Hard Strata at a Shallow Depth, the Construction Agency shall be advised by the Engineer regarding the Termination Level and the same shall be in conformity with the Code Provisions.

- **Pile Diameters**

  Piles of two different diameters i.e. 1200mm and 1000mm have been proposed based on the Length of Span and are detailed in **Drawing No. MC / BBMP / 2618 / ELC – IRR / CS / 105A** and **Drawing No. MC / BBMP / 2618 / ELC – IRR / CS / 105B** respectively.

  The Grade of Concrete for the Pile is M35. The Cement Content for Pilling Work has been assumed as 400 kg / m^3 with Ordinary Portland Cement of Grade 43. However, the Pile Foundations shall satisfy the following Requirements.

  - Only Bored Cast – in – Situ Piles will be accepted.
  - The Pile Foundations shall be designed as per the requirements of IS: 2911 (Part I / Section – 2) – Latest Revision.
  - The Design Capacity assumed for the Piles shall be verified by the Initial Load Testing of Test Piles in Non Working Areas, in the vicinity of the Elevated Corridor Site. These Piles shall be tested for 2.0 times the Design Load and Number of such Tests shall be done for each Diameter of Pile. Additional one Pile

for each Diameter, which is actually going to be used for Piers, shall be tested for 1.5 times the Design Load.

- Annular Piles filled or unfilled shall not be accepted.
- Design with single row of piles shall not be accepted.
- Design shall ensure that no Pile is subjected to Tension.
- Concreting shall be done by Tremie Method after ensuring proper tip zone cleaning by flushing only.
- The Top of Concrete in Piles shall be brought above the Cut off Level by minimum 750mm to permit Removal of all Laitance and Week Concrete before Pile is laid.

7.4.3 Ramps / Retaining Walls

The adoption of Reinforced Earth Panel is economical and the Construction can be faster compared to Conventional Retaining Walls. Hence, Solid Ramp Portion of the Elevated Corridor has been proposed to be constructed with Reinforced Earth Retaining Structure. This Work consists of Reinforced Soil Structures as per Terramesh Reinforced Soil Wall with Concrete Panel / Segmental Block Facia comprising of Mechanically Woven Double Twisted Hexagonal shape, (Zn + PVC) Coated Wire Mesh as per the Detailed Specifications.

The Work is generally done in conformity to the MoRT&H Specification / BS: 8006 Specifications. The Detailed Design and Drawings of the Work have been done in accordance with the MoRT&H Specification and Guidelines contained in the IRC. Patentee's Specifications has been incorporated wherever relevant.

The Materials shall be procured from the Supplier of the Reinforced Soil Technology approved by the Engineer. The Designs and Drawings shall be got approved from the Client or its Consultants before Execution of Work.

7.4.4 Substructure

The Substructure shall satisfy the following Requirements.

a. Dimensions

- Dimension of any Element of Substructure shall not be less than 300mm.
- All RCC Piers shall be of Solid Type.
- The Height of Pedestals on Pier Cap supporting Bearings shall not be more than 300mm.

b. Layout and Design

- All Bearings shall be supported directly on Pier Stem. However, Bearings resting on Overhangs are acceptable provided the Differential Deflection of Pier Cap is accounted in the Transverse Analysis of Superstructure.
- Scope for Accessibility for Inspection of Bearings and Arrangement for Lifting of the Superstructure for Future Replacement of Bearings shall be provided in the design of Substructure and Superstructure.

Piers

The Piers considered for design is of two types. The first type is Square Type (2.5m X 2.5m) that has been adopted for all the Spans except the Obligatory Spans near Up Ramp and Down Ramp whereas for the Obligatory Spans near Up Ramp and Down Ramp Circular Pier of 1.8m Diameter has been proposed. The Design has been based on the Combination of Design Loads producing the worst effect. One Span Dislodged Condition has also been taken into consideration while designing the Piers. The Details are given in **Drawing No. MC / BBMP / 2618 / ELC – IRR / CS / 105A** and **Drawing No. MC / BBMP / 2618 / ELC – IRR / CS / 105B** respectively.

7.4.5 Superstructure

The Choice of Superstructure mainly depends on the Span and the Aesthetic Importance. The Spans are determined based on the Superstructure and Feasibility of Transporting Long Span Precast Girders. It is advisable that Construction of Superstructure proceeds with Surface Level Construction like Pier Construction. Precast Beam Girders have been proposed for the Superstructure at Standard Spans whereas Cast – in – Situ Box Girders have been proposed for the Superstructure at Obligatory Spans except the Obligatory Spans near Up Ramp and Down Ramp. Based on the Site Conditions, Cast – in – Situ Solid Slabs have been proposed for Obligatory Spans near Up Ramp and Down Ramp. The Details are given in **Drawing No. MC / BBMP / 2618 / ELC – IRR / CS / 105A** and **Drawing No. MC / BBMP / 2618 / ELC – IRR / CS / 105B** respectively.

7.4.6 Bearing below Superstructure

Bearing controls the Transfer of the Forces from Superstructure to Substructure. Bearings under Superstructure shall be within the External Line of the Pier / Abutment. The Bearings shall be provided below the Diaphragm at Suitable Locations.

- The Type of Bearing generally allowed is as below.

Span	Type of Bearing
For effective spans upto 20m	POT cum PTFE
For effective spans more than 20m	POT cum PTFE

- The Bearing shall be easily Accessible for Inspection / Maintenance.
- Scope for Lifting the Superstructure for Future Replacement of Bearing shall be provided in the Design of Bearing. The Scheme of Lifting shall be indicated on the Drawing to be submitted by the Contractor along with the Technical Bid.
- Inspection of Bearing by Director General of Supplies and Disposal (DGSD) during manufacturing is essential. The Construction Agency shall have to produce necessary Certificate and Inspection Marks from the DGSD at his own cast.
- The Bearing shall conform to the Requirements of the MoRT&H Specifications.
- The Dimensions of Top Plate of Bearing shall be such that the Contact Surface of the Superstructure projects beyond the Edge of Bearing Plate by a minimum Distance of 50mm at any location.

7.4.7 Expansion Joints

Elastomeric Strip Seal Type Expansion Joint conforming to Clause 2607 of MORT&H Specifications has been considered. Calculations for the Adequacy of the Expansion extent for which the Joint is selected by the Engineer shall be submitted along with Name of Manufacturer and their Technical Details. During. Installation of these Joints, Manufacturer's Engineer shall be required to supervise the same including the Thermal Presetting, if required.

7.5 Crash barriers

Concrete Crash Barriers shall conform to Clause 809 of MoRT&H Specifications. The Height of the Concrete Crash Barrier is 1000mm above the Finished Road Level. It has been designed to resist an Impact of 30t Axle Loads.

7.6 Wearing Coat

Wearing Coat conforming to Clause 2702.1 of MoRT&H Specifications for Road and Bridge Works (latest edition) has been provided for Smooth Riding Surface.

7.7 Approach Slab

The Approach Slab conforming to Clause 2704 of MoRT&H Specifications for Road and Bridge Works (Latest Edition) has been provided.

7.8 Durability

From the Durability Consideration, the following minimum Grades of Concrete are to be considered for Plain Cement Concrete (PCC), Reinforced Cement Concrete (RCC) and Pre Stressed Concrete (PSC).

a. Minimum Grade of Concrete shall be as below.

PCC for Levelling Course	M15
RCC for Open Foundation, Substructure and Superstructure	M30
Pre Stressed Concrete	M35

b. Minimum Cement Content, Diameter of Bar and Cover Requirements
For PCC, RCC and PSC, the Value given below regarding minimum Cement Content and maximum Water Cement Ratio shall be followed.

PCC		RCC / PSC	
Minimum cement Content Kg / cum.	Maximum Water Cement Ratio	Minimum cement Content Kg / cum.	Maximum Water Cement Ratio
360	0.45	380 / 400	0.45 / 0.40

The minimum Nominal Diameter of Reinforcement is 8mm.

7.9 Drainage

Drainage of Storm Water collected on the Elevated Corridor and at Surface Level Roads are essentially based on

IRC: SP: 42 – 1994 – "Guidelines on Road Drainage".
IRC: SP: 50 – 1999 – "Guidelines on Urban Drainage".

The Drainage Spouts conform to Clause 2705 of MoRT&H Specifications.

7.10 Traffic Signs, Markings and other Road Appurtenances

Traffic Signs, Markings and other Road Appurtenances shall conform to Clause 800 of the MoRT&H Specifications for Road and Bridges (Latest Edition). Road Markings shall conform to IRC: 35 – 1997 and Road Signs shall confirm to IRC: 67 – 2001.

7.11 Medians, Kerbs and Footpaths

Medians, Kerbs and Footpaths shall conform to Clause 407, 408 and 409 of the MoRT&H Specifications for Road and Bridges (Latest Edition).

7.12 Lighting

The Lighting on the Elevated Corridor, Junction at Surface Level and along Surface Level Road, etc. has been provided as per relevant Codal Provisions.

7.13 Specification and Design Codes

The Designs of Structural Components have been in conformation to the Criteria laid down in the Latest Editions of the following Codes of Practice and Standard Specifications.

a. IRC Standard Specifications and Code of Practice for Road Bridges with amendments issued upto the Date of Issue of Tender Notice.

IRC: 5	General Features of Design
IRC: 6	Loads and Stresses
IRC: 15	Construction of Concrete Roads
IRC: 22	Composite Construction (Limit State Design)
IRC: 24 (Section V)	Steel Road Bridges
IRC: 35	Road Markings
IRC: 37	Design of Flexible Pavements
IRC: 38	Design of Horizontal Curves for Highways and Design Tables
IRC: 44	Cement Concrete Mix Design for Pavements
IRC: 54	Lateral and Vertical Clearances at Underpasses for Vehicular Traffic
IRC: 58	Design of Plain Jointed Rigid Pavements for Highways
IRC: 67	Road Signs
IRC: 78	Foundation and Substructure
IRC: 79	Road Delineators
IRC: 83 (Part I)	Metallic Bearings

IRC: 83 (Part II)	Elastomeric Bearings
IRC: 83 (Part III)	POT, POT cum PTFE, PIN and Metallic Guide Bearings
IRC: 86	Geometric Design Standards for Urban Roads in Plains
IRC: 92	Design of Interchanges in Urban Areas
IRC: 103	Pedestrian Facilities
IRC: 112	Concrete Road Bridges
IRC: SP: 23	Vertical Curves for Highways
IRC: SP: 42	Road Drainage
IRC: SP: 56	Steel Pedestrian Bridges
IRC: SP: 57	Quality Systems for Road Construction
IS: 2911 (All Parts)	Pile Foundations

b. IRC – SP: 33 Guidelines on Supplemental Measures for Design, Detailing and Durability of Important Bridge Structures (if applicable).
c. Specification for Roads and Bridge Works (Latest Edition), published by IRC, New Delhi on behalf of Govt. of India, Ministry of Shipping, Road Transport and Highways.

7.14 Boring Data and Soil Investigation at Site

The Details of Boring Data and Soil Investigation Report have been enclosed in **Chapter 4.**

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Chapter – 8

Traffic Management / Diversion and Traffic Engineering Schemes

CHAPTER 8
TRAFFIC MANAGEMENT / DIVERSION DURING CONSTRUCTION AND TRAFFIC ENGINEERING SCHEMES

8.1 General

Traffic Management / Diversion during Construction of Elevated Corridor along 100ft. Inner Ring Road is essential for smooth flow of traffic. Traffic Diversion / Management during Construction has been planned in such a way so that not to cause inconvenience to the existing Traffic Movement along the Corridor and the Width of Carriageway available for Traffic Movement during Construction is adequate.

8.2 Traffic Management during Construction

Work on the entire length of the Elevated Corridor has been planned continuously for 30 months. The available land for the proposed Slip Road on either side of the Elevated Corridor shall be strengthened to allow the traffic. Based on the Site Condition and the Approved Concept, the entire Scheme for Traffic Diversion has been worked out in two phases, i.e. **Phase 1:** Elevated Corridor along 100ft. Inner Ring Road and **Phase 2:** Up Ramp and Down Ramp at Kendriya Sadana Junction. The Details are given in **Drawing No. MC / BBMP / 2618 / ELC – IRR / TM / 107A, Drawing No. MC / BBMP / 2618 / ELC – IRR / TM / 107B, Drawing No. MC / BBMP / 2618 / ELC – IRR / TM / 107C** and **Drawing No. MC / BBMP / 2618 / ELC – IRR / TM / 107D** respectively.

Solid Ramp and Viaduct Portion of the Elevated Corridor will be barricaded to Width of Pier / Earth Filled Ramp plus 4.6m extra (to accommodate Working Space for Foundation) on either side whereas Solid Ramp and Viaduct Portion of the Up and Down Ramps near Kendriya Sadana Junction will be barricaded to Width of Pier / Earth Filled Ramp plus 4.25m extra (to accommodate Working Space for Foundation) on either side for entire Construction Work. This Scheme shall ensure smooth flow of traffic during the entire Construction Period. During the entire Construction Period, Street Parking on all the Approach Arms of the Junctions coming under the Project Stretch shall be strictly prohibited. Construction Activity of Superstructure at the Obligatory Spans shall be planned only during night. The scaffolding of Obligatory Spans will be arranged in such a way that the traffic across 100ft. Inner Ring Road and other Traffic taking turn at the Junctions can move freely within the clear space between the scaffoldings.

8.3 Necessary Improvements

For Effective Implementation of Traffic Diversion Scheme, Diversion Routes shall be kept in Traffic Worthy Condition (Free from Pot Holes, Ruts, Undulation, etc.) during the entire Construction Period.

Necessary Signboards for guiding the Road Users shall be located as per IRC Norms. The Traffic Management Scheme and Traffic Diversion Plans proposed shall be discussed with Police Authorities before Implementation. All the Necessary Improvements and Location of Signboards shall be finalized during Implementation in discussion with Police Authorities.

8.4 Traffic Engineering Schemes Components

Design of At Grade Junction is essential for proper dispersion of traffic retained at Surface Level Road in the Post Construction Scenario. The various Components of At Grade Junction and on the Elevated Corridor that need to be Planned, Designed and Built Integrally in the Elevated Corridor Scheme are detailed in Table 8.1. Planning and Design of these Components are as per the Guidelines stipulated in IRC.

Table 8.1
Components of At Grade Junction and Grade Separation Scheme

Sl. No.	Components	Description	Standards
1.	Traffic Signals	Fully Automatic Traffic Signal with Timer (Solar)	IRC: 93 – 1985
2.	Road Markings	On Elevated Corridor and at Surface Level Roads	IRC: 35 – 1997
3.	Road Signs	On Elevated Corridor and at Surface Level Roads	IRC: 67 – 2012 & IRC: SP – 31 – 1992
4.	Road Delineators	On Elevated Corridor and at Surface Level Roads	IRC: 79 – 1981
5.	Geometrics	Surface Level Roads	IRC: 86 – 1983
6.	Geometrics	Junction	IRC: SP – 41 – 1994
7.	Pedestrian Facilities	At Surface Level Roads and near the Junction (Footpaths, Railing and Zebra Crossing)	IRC: 103 – 2012

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Chapter – 9

Project Cost and Economic Evaluation

Kendriya Sadana Junction

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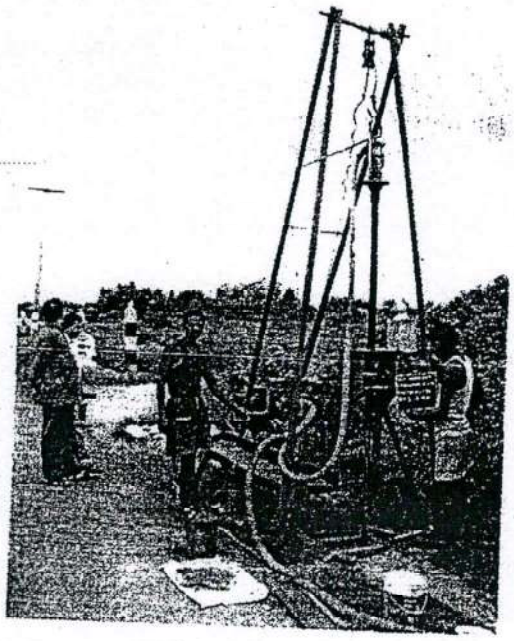
REPORT ON GEOTECHNICAL INVESTIGATION FOR PROPOSED CONSTRUCTION OF UNDERPASS AND FLYOVER AT ST. JOHN'S HOSPITAL ROAD, KORAMANGALA 100 FEET ROAD JUNCTION, BANGALORE.

JOB NO. : SEA/BBMP/MANASA/GT/KORAMANGALA 100 FT ROAD/2010-11



REPORT FOR

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JANUARY 2010 -?

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REPORT ON GEOTECHNICAL INVESTIGATION FOR PROPOSED CONSTRUCTION OF UNDERPASS & FLYOVER AT ST. JOHN'S HOSPITAL ROAD, KORAMANGALA 100 FEET ROAD JUNCTION, BANGALORE.

1. Introduction

The foundation is part of an engineered system that transmits to, and into, the underlying soil or rock the loads supported by foundation and it's self-weight. The resulting soil stresses-except at the ground surface-are in addition to those presently existing in the earth mass from its self-weight and geological history. Also the successful performance of Foundation Structure depends as much as adopting standards of good load distribution successfully to the ground.

Investigation of the underground conditions at a site is prerequisite to the economical design of the substructure elements. It is also necessary to obtain sufficient information for successful performance of foundation and substructure.

The elements of Geotechnical Site Investigation depend heavily on the project but generally should provide the following;

- Information to determine the type of foundation required (shallow or deep).
- Information to allow the geotechnical engineer to make a recommendation on the allowable load capacity of the foundation.
- Sufficient data / laboratory tests to make settlement predictions.
- Location of Ground Water Table (or determination of whether, it is in the construction zone).
- Information so that the identification and solution of construction problems.
- Identification potential problems (settlements, existing damage etc).

M/s. Manasa Consultants, Bangalore proposes to construct Flyover at Koramangala: 100 Feet Road Junction, Bangalore.

M/s SHEETAL ENGINEERING ASSOCIATES (Building, Geo-Tech & Highway Material Research Laboratory). Chamarajpet, Bangalore was assigned to carry out the GeoTechnical Investigation work at the above said project site locations with a view to furnish the detailed Geo-Technical Information of the nature and sub-soil strata for detailed Foundation Designs.

2. Location of Investigation Site

The locations of Field Geotechnical investigations were carried out at Koramangala 100 Ft Road Junction, Bangalore.

The Plan Showing Location of Borehole Investigations were carried out is enclosed vide Figure No. 1 to 6.

3. Objectives and Scope of Work

3.1 Objectives

The objectives of Geo-Technical Investigation are to evaluate the following:

- To ascertain the sub-soil strata at project Site
- To study standing Ground Water Level
- To study the physical and engineering properties of soil strata
- To evaluate allowable safe bearing capacity of soils to design foundations
- To Recommend type and depth of foundation
- To recommend improvements to the weak soil strata if any

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3.2. Scope of the Work

The Scope of Geo-technical Investigations includes the following Insitu and Laboratory Tests.

3.2.1. Field Investigations

i) Boring 2 Nos. of 150mm / Nx size Boreholes in all kinds of soils, Soft Rock and Hard Rock up to 16.0 m or up to 3.0 m in Bed Rock whichever encounter early using Rotary operated Drilling Rig.
ii) Determination of natural density as per IS: 2720 Part 29.
iii) Conducting field-testing such as Standard Penetration Tests as per IS: 2131-1981.
iv) Collecting Undisturbed Sand Samples as per IS: 8763.– 1978.
v) Collecting disturbed and undisturbed soil samples at Ground level in the Boreholes as per IS: 1892-1979.

3.2.2. Laboratory Testing

The scope of Laboratory Testing is as follows:

i) Grain Size Analysis as per IS: 2720 (Part 4) – 1985.
ii) Specific Gravity as per IS: 2720- (Part 3 / Section 1&2) - 1980.
iii) Atterberg Limits as per IS: 2720 (Part 5) – 1985 & IS: 2720 (Part 6, 20, 40 & 41) - 1977.
iv) Determination of natural moisture content as per IS 2720 (Part 18) - 1978.
v) Determination Differential Free Swelling Index as per IS: 2720 (Part 40) - 1977
vi) Determination of Triaxial Strength tests by CU method as per IS: 2720 – (Part 10) - 1973
vii) Determination of Unit Weight, Specific Gravity and Water Absorption of Rock Core Samples as per IS: 2386 – Part III
viii) Determination of Unconfined Compressive Strength of Rock Core Samples as per IS: 9143.

3.3. Report

This comprises preparing a detailed report including soil profiles, physical and engineering properties of soil/rock samples based on laboratory as well as field investigation/tests, recommendations regarding allowable bearing pressure, type and depth of foundations and improvement to existing Foundation Soils. Allowable Load on Piles, type, size and depth of Piles etc and submission of Detailed Technical Report with complete relevant recommendations in Triplicate.

4.0. Schedule of Investigations

4.1. Field Investigations

To study sub-soil strata, field investigations were carried out by drilling 02 Nos. 150 mm dia Boreholes using Calyx operated Rig up to a maximum depth of 16.0 m below existing ground at the proposed project Site at the specifred locations.

Plans showing location of Borehole Investigations was carried out is enclosed vide Fig. No.1.

Table 4.1 Details of Ground Level and termination depth of each Borehole

Sl. No	Investigation Locations	BH No.	Termination Depth from EGL (m)
1	Koramangala 100 Feet Road Junction	BH 1	16.00
2	Koramangala 100 Feet Road Junction	BH 2	15.00

BH: Borehole through Rotary Rig

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4.2 Standard Penetration Tests

Standard Penetration Tests (SPT) was conducted using split spoon sampler as per IS: 2131-1981 at various depths in Boreholes to determine 'N' values as well as relative density and stiffness of the soil. .

Table 4.2 Details of SPT Tests conducted in Boreholes

Sl. No	Location Details	BH No.	SPT Depth (m) & SPT Values (Blows)					
			1.5/2.5	3.0/4.0	4.5/5.50	6.0	7.5/8.0	9.0/10.50
1	Koramangala 100 Feet Road Junction	BH 1	2+3+3	2+3+5	3+5+5	4+5+7	2+2+3	4+4+4 / 5+6+8
2	Koramangala 100 Feet Road Junction	BH 2	8+9+11	9+11+12	10+11+12	10+12+12	9+11+13	12+14+14 / 15+15+15

BH: Borehole through Rotary Rig. R: Refusal (N>100 Blows for 30 cm penetrations)
UDS: Undisturbed Soil Samples R: Rebound (No Penetrations)

4.3 Sampling

4.3.1 Disturbed / Representative Soil Samples (DS/RS) and UDS Soil Samples

Disturbed/Representative samples (DS/RS) were collected during drilling and also during SPT Tests. The Representative Samples from the split spoon sampler and UDS samples using 100 mm thin walled Shelby tubes were also collected. The samples recovered were packed in polythene bags, labeled and sent to the laboratory for carrying out relevant laboratory testing.

Table 4.3 Details of Soil Samples collected from Boreholes

Sl. No	Bridge Details	BH No.	Depth of Sampling (m)	Type of Sampling
1	Koramangala 100 Feet Road Junction	BH 1	1.50, 3.00, 4.50, 6.00, 7.50, 9.00, 10.50	SPT
2	Koramangala 100 Feet Road Junction	BH 2	1.50, 3.00, 4.50, 6.00, 7.50, 9.00, 10.50	SPT

DS: Disturbed Soil Samples UDS: Undisturbed Soil Samples

4.3.2 Rock Core Samples

Rock Core Samples were collected during field investigations, labeled and numbered and arranged in Core Boxes. The collected Rock Core Samples along with Core Boxes were sent to the laboratory for testing.

Table 4.4 Details of Rock Core Samples collected from Boreholes

Sl. No	Bridge Details	BH No.	Depth (m)	Core Recovery (%)	RQD (%)
1	Koramangala 100 Feet Road Junction	BH 1	2.50	34.00	25.50
2	Koramangala 100 Feet Road Junction	BH 2	1.50	31.33	14.66

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4.4 Water Table Level

During field investigations the standing Water Table levels were studied and recorded in the Borehole log vide Table Nos. 6.3 to 6.7.

4.5 Ground Topography, Geology of the area and Sub-soil Details

The ground topography, geology at the Site location and sub-soil details at the Site location on Koramangala 100 Ft Road Junction was studied and recorded in the Borehole logs.

4.6 Laboratory Tests

The following laboratory tests were conducted on the collected disturbed, undisturbed soil samples and Rock Core Samples.

i) Grain Size Analysis as per IS: 2720 (Part 4) – 1985.
ii) Specific Gravity as per IS: 2720- (Part 3)/Section 1 - 1980 and IS: 2720 – (Part 3)/Section 2 - 1980.
iii) Atterberg Limits as per IS: 2720 (Part 5) - 1985; IS: 2720 (Part 6, 20, 40 and 41) - 1977.
iv) Determination of natural moisture content as per IS: 2720 (Part 18) - 1978.
v) Determination of natural density as per IS: 2720 (Part 29)
vi) Determination Differential Free Swelling Index as per IS: 2720 (Part 40) - 1977
vii) Determination of Triaxial Strength tests by CU method as per IS: 2720 – (Part 10) - 1973
viii) Determination of Unit Weight, Specific Gravity and Water Absorption of Rock Core Samples as per IS: 2386 – (Part 3)
ix) Determination of Unconfined Compressive Strength of Rock Core Samples as per IS: 9143

5.0 Results and Discussions

The results of field investigations and laboratory tests are presented in Borehole logs cum sub-soil profile and laboratory tests results.

5.1. Soil Profile and Classification

The ground topography at the Road Site locations is fairly level and slightly varying from Location to locations. General Subsoil profile is interpreted from borehole. For this purpose whenever necessary, field borehole logs have been corrected on the basis of laboratory tests conducted on samples.

5.2. Standard Penetration Number

The results of SPT test at all the boreholes s at various depths confirm that the Soil / Sandy Strata is medium stiff and Rocky strata are soft. The observed 'N' values at all the Boreholes locations are indicated on the borehole logs cum sub-soil profiles (Tables 6.3 to 6.7.)

5.3. Specific Gravity

The specific Gravity of Soil / Sand is indicated in the Borehole Log cum Lab Test Results vide Table Nos. 6.3 to 6.7.

5.4. Liquid Limit and Plastic Limit

The Liquid Limit of sub soil is indicated in the Borehole Log cum Lab Test Results vide Table Nos. 6.3 to 6.7.

5.5 Cohesive Strength and Friction Angle

The Cohesive strength of underlain of sub soil observed is indicated in the Borehole Log cum Lab Test Results vide Table Nos. 6.3 to 6.7.

5.6 Differential Free Swelling Index

The Free Swelling Index of underlain of Soil / Sand observed is indicated in the Borehole Log cum Lab Test Results vide Table Nos. 6.3 to 6.7.

5.7. Rock Depth or Refusal Strata

The details of SDWR and Soft Rock Gneiss Rock is encountered at different depths below existing bed level and indicated in the Borehole logs.

5.8. Water Table Level

The details of Water Table encountered during field investigations are indicated in the Borehole logs.

Table 5.1 Details of Ground Water Table depth

Sl. No	Bridge Details	BH No.	Water Table Depth from EGL (m)
1	Koramangala 100 Feet Road Junction	BH 1	2.00
2	Koramangala 100 Feet Road Junction	BH 2	2.25

6.0. Recommendations

6.1 Allowable Safe Bearing Capacity of Soils, Soft Weathered Rock (SDWR) and Soft Rock

The safe bearing pressure of soil has been evaluated as per IS 6403-1982, IS 8009 part I-1993, IS 1904 as per Terzaghi / Thomlinson's Theory, based on 'N' values (Teng's) Theory considering the following criteria.

i) Local Shear failure condition
ii) Settlement criteria: Based on 'N' values as per IS 8009
iii) Unconfined Compressive Strength of Rock Core

RCC Open / Strip Foundation may be adopted through and allowable Safe Bearing Capacity for minimum 3.0 m width of Footing and Foundations.

Table 6.1 Recommended Safe Bearing Capacity of Soils, SDWR and Soft Rock

No	BH No.	Depth below EGL (m)	Type of strata	Recommended Bearing Capacity (T/Sq.m)	
				Ultimate Bearing Capacity	Safe Bearing Capacity
ST. JOHN'S HOSPITAL ROAD, KORAMANGALA 100 FT ROAD JUNCTION					
1	BH 1	3.00	Reddish Yellow Sandy Silty Clay Soil	37.50	15.00
2	BH 1	500	Reddish Yellow Sandy Silty Soil	42.50	17.00
3	BH 1	7.00	Reddish Yellow Sandy Silty Soil	47.50	19.00
4	BH 1	9.00	Pinkish White Sandy Silty Soil	52.00	21.00
5	BH 1	15.00	Whitish Blackish Hard Rock	1285.00	160.00

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ST. JOHN'S HOSPITAL ROAD, KORAMANGALA 100 FT ROAD JUNCTION					
1	BH 2	3.00	Yellowish Red Silty Sandy Soil	37.50	15.00
2	BH 2	5.00	Yellowish Red Silty Sandy Soil	42.50	17.00
3	BH 2	7.00	Yellowish Red Silty Sandy Soil	47.50	19.00
4	BH 2	9.00	Yellowish Red Silty Sandy Soil	52.00	21.00
5	BH 2	15.00	Brownish Whitish Hard Rock	1375.00	171.00

FS in Soils / Sand = 2.5 FS in SDWR = 2.5 FS in Soft & hard rock = 8.00

6.2. Additional Recommendations

- Buoyancy effect is not considered during SBC calculations; this shall be taken in to account during Structural Design of Foundations.
- The minimum confined depth of foundation shall be 3.00 m from existing Ground Level.
- The Anchoring in the Rock shall be suitably designed and provided for the footing / foundation resting on Rock (Soft or Hard Rock).
- Pile foundations are not necessary but only shallow foundation required.

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Specimen SBC and Settlement Calculations : BH 2 at 3.00 m D

Terzaghi's Bearing Capacity Factors :

ϕ	Nc	Nq	Nγ
0	5.70	1.00	0.00
5	7.30	1.60	0.50
10	9.60	2.70	1.20
15	12.90	4.40	2.50
20	17.70	7.40	5.00
25	25.10	12.70	9.70
30	37.20	22.50	19.70
34	52.60	36.50	30.00
35	57.80	41.40	42.40
40	95.70	81.30	100.40
45	172.30	173.30	297.50
48	258.30	287.90	780.10
50	347.50	415.10	1153.20

Water Table Correction Factors:

Wq	Wr
1.00	1.00

(No Water Table is Encountered)

0.50	0.50

(If Water Table touches the FL)

1.1 SAFE BEARING CAPACITY BASED ON TERZAGHI'S THEORY :

a) Calculation of Bearing Capacity Factors:

ϕ	Nc	Nq	Nγ
26	27.52	14.66	11.7

Na= SPT = 8

b) Calculation of SBC :

UBC (kg/Sq.cms) = 1.3 CNc + 0.5*γ*D*Wq*Nq +0.4 * γ *B*Wγ *Nγ

C	ϕ	γ	L	B	D	Nc
0.28	26	0.00176	600	600	300	11.2
(Kg/Sq.cms)	(degrees)	(kg/Cu.cms)	(cms)	(cms)	(cms)	(Blows)

UBC(T/Sq.m)	SBC(T/sq.m)
163.5856	65.43424
(T/Sq.mts)	(T/Sq.mts)

1.2. SAFE BEARING CAPACITY BASED ON TENG'S THEORY :

N = Standard Penetration Number = 18.2

Q safe = 0.0167*N*B*Wq + 0.027*(100+N*N)*D*Wγ = 21.870084 (T/Sq.mts)

1.3. SAFE SETTLEMENT PRESSURE BASED ON TENG'S THEORY :

Rd = Depth Correction Factor = 1+(0.2D/B) <= 1.2 — 1.100

Qssp (T/Sq.m) = 3.5 (N-3)*((B+0.3)/(2B)) **2 Wγ Rd — 1.100

Qssp (T/Sq.m) = 3.5x(18.2-3)((600+0.3)/2x600}^2x1x1.1 — 16.13

1.4. SAFE BEARING CAPACITY AS PER IS 6403 -1982 :

ϕ	Nc	Nq	Nγ
0	5.14	1.00	0.00
5	6.50	1.60	0.40
10	8.30	2.50	1.20
15	11.00	3.90	2.60
20	14.80	6.40	5.40
25	20.70	10.70	10.90
30	30.10	18.40	22.40
32	35.50	23.20	30.20
34	42.20	29.40	41.00
36	50.60	37.80	56.50
38	61.40	48.90	78.00
40	75.30	64.20	109.40
45	133.90	134.90	270.00
50	319.100	319.10	763.00

a) Bearing Capacity Factors (IS 6403):

ϕ	Nc	Nq	Nγ
26	22.58	12.24	13.2

b) Water Table Correction Factors:

Water Table may rise to founding level in

Wq	Wr
0.50	0.50

c) Depth Factors:

Dc = 1.16003345 Dq=Dγ= 1.08001673

d) Shape Factors:

Sc =	1.11	for Square & circle
Sq =	1.05	for Square & circle
Sγ =	0.60	for Square

e) Load Inclination Factors:

Ic =	1.00
Iq =	1.00
Iγ =	1.00

Qult (T/Sq.m) = C Nc Sc Dc Ic +q (Nq-1) Sq Dq iq Wq+ 0.5 γ B Nγ Sγ Iγ Wγ

Qult (T/Sq.m) = 137.66

(The Factor of Safety is recommended as per the Type of Soil, Type of footing and

Factor of Safety = 2.5 Qsafe = Qult/FS = 55.064 (T/Sq.m)

Minimum of the Above Three SBC (T/Sq.m) = 16.13 16.10

Actual Recommended = 14 14.00 T/Sq.m

(Minimum of Above four methods)

1.5. ALLOWABLE SETTLEMENT AS PER IS 8009 -1982 BASED ON N VALUES.:

Nc=11.2 B=600 Settlement Factor = 0.0066

Recommended SBC = 14.00T/Sq.m = 1.40 kg/Sq.cms

Allowable Settlement (mm) = 9.24 < 50 mm as per IS 1904, Hence Safe

Hence the Foundation is safe against allowable settlement of 50 mm with 14.00 T/sq.m SBC as per IS 1904

1.6 : SBC of Rock Based on UCC Strength of Rock at 15.00 m

SBC OF ROCK as Per UCC STRENGTH OF ROCK

Crushing Strength of Rock = 1285 T/Sq.m

Factor of Safety in Rock = 8

SBC of Rock = Crushing Strength / FS = 160

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M/s Manasa Consultants

Table - 7.0 Borehole Log, Sub-Soil Profile & Laboratory Test Results

Subject : Consultancy Services for preparation of Feasibility for Construction of Underpass & Flyover at St. John's Hospital Road, Koramangala 100 ft Road Junction, Bangalore.
Client : M/s Bruhat Bangalore Mahanagara Palike, Bangalore.
Consultant : M/s Manasa Consultants, Bangalore
Location : St John's Hospital Road Koramangala 100 ft Road Junction

Date of Execution : 28.01.2010

Ground Water Level : 2.00 m
Borehole Level : Not Known
Borehole Termination Depth : 16.00 m
Page No / Sheet No : 1 of 1

Borehole No : BH 1
Method : Rotary Boring through Calyx Rig

Depth Below Ground (m)	Legend	Sub Soil Strata	Sample Type / SPT Value	Grain Size Analysis: Gravel %	Sand %	Silt + Clay %	LL %	PL %	PI	IS / AASHTO Classific-	Insitu Moisture Content %	Insitu Density gm / cc	Triaxial Strength Parameters: Cohesive Strength kg / cm²	Angle of Internal degrees
0.000														
0.500														
1.000														
1.500			SPT @ 1.5 m N = 2+3+3											
2.000		Reddish Yellow Sandy Silty Clay Soil												
2.500			UDS	2.42	46.18	51.4	40	21	19	CL	12.75	1.76	0.28	26
3.000			SPT @ 3.0 m N = 2+3+5											
3.500														
4.000														
4.500			SPT @ 4.5 m N = 3+5+5											
5.000														
5.500			UDS											
6.000		Reddish Yellow Sandy Silty Soil	SPT @ 6.0 m N = 4+5+7	5.49	57.23	37.28	36.00	23.00	13.00	SC	9.48	1.80	0.00	28.00
7.000														
7.500			SPT @ 7.5 m N = 2+2+3											
9.000		Pinkish White Sandy Silty Soil	SPT @ 9.0 m N = 4+4+4											
10.500			SPT @ 10.5 m N = 5+6+8											

Engineering Associates, Bangalore

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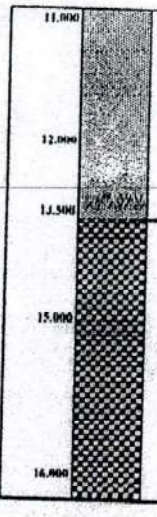

WASHED SAMPLE

		Type of Samples	Core Length (cms)	Core Recovery %	RQD %	Type of Rock	Sp. Gr.	Water Absorption %	Unit Weight (gm / cc)	UCC Strength (Unsaturated) T / m2	UCC Strength (saturated) T / m2	Remarks
Brownish Whitish Soft Rock												
Whitish Blackish Hard Rock	Core Samples	8.00 4.00 3.00 10.00 11.00 15.00	34.00	25.50	Hard Rock	2.45	0.34	2.64	1285.00		

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Table - 7.1 Borehole Log. Sub-Soil Profile & Laboratory Test Results

Subject : Consultancy Services for preparation of Feasibility for Construction of Underpass & Flyover at St. John's Hospital Road, Koramangala 100 ft Road Junction, Bangalore

Client : M/s. Bruhat Bangalore Mahanagara Palike, Bangalore

Consultant : M/s. Manasa Consultants, Bangalore

Location : St. John's Hospital Road, Koramangala 100 ft Road Junction

Borehole No : BH 2

Method : Rotary Boring through Calyx Rig

Date of Execution : 28.01.2010

Ground Water Level : 2.25 m

Borehole Level : Not Known

Borehole Termination Depth : 15.00 m

Page No / Sheet No : 1 of 1

Depth Below Ground (m)	Legend	Sub Soil Strata	Sample Type / SPT Value	Grain Size Analysis			LL	PL	PI	IS / AASHTO Classification	Insitu Moisture Content	Insitu Density	Triaxial Strength Parameters	
				Gravel	Sand	Silt + Clay							Cohesive Strength (Cu)	Angle of Internal Friction (ɸ cu)
				%	%	%	%	%			%	gm / cc	kg / cm²	degrees
0.000														
0.500														
1.000		Yellowish Red Silty Sandy Soil												
1.500			SPT @ 1.5 m N = 8+9+11											
2.000			UDS	1.08	42.92	56	36	NP	NP	CL	9.54	1.82	0	25
2.500														
3.000		Yellowish Red Silty Sandy Soil	SPT @ 3.0 m N = 9+11+12											
3.500			UDS	3.21	48.26	48.53	42	NP	NP	SC	8.15	1.78	0	26
4.000														
4.500			SPT @ 4.5 m N = 10+11+12											
5.000														
5.500			UDS											
6.000		Yellowish Red Silty Sandy Soil	SPT @ 6.0 m N = 10+12+12											
7.000														
7.500			SPT @ 7.5 m N = 9+11+13											
9.000		Yellowish Red Silty Sandy Soil	SPT @ 9.0 m N = 12+14+14											
10.500			SPT @ 10.5m N = 15+15+15											

11.000 12.500 13.000		Browoish Yellowish Soft Rock											
			Type of Samples	Core Length (cms)	Core Recovery %	RQD %	Type of Rock	Sp. Gr.	Water Absorption %	Unit Weight (KN / M³)	UCC Strength (Unsaturated) T / m2	UCC Strength (saturated) T / m2	Remarks
14.000 15.000		Browoish Whitish Hard Rock	Core Samples	6.00 8.00 6.00 5.00 12.00 10.00	31.33	14.66	Hard Rock	2.42	0.53	2.58	1375.04		

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Chapter – 5

Planning and Design Considerations

CHAPTER 5
PLANNING AND DESIGN CONSIDERATIONS

5.1 General

Planning and Design of Elevated Corridor Facility comprising of Elevated Corridor, Surface Level Roads, At Grade Junction, Pedestrian Facilities, etc. shall be essentially based on the Design Standards as stipulated in relevant IRC Standards and MoRT&H Specifications. Whenever, the Codes / Standards are silent on some of the aspects, the same shall be planned / designed based on the Sound Engineering Practices. Design Standards relevant to the Project Road along with the Broad List of Design Parameters and the relevant IRC Codes / Specifications have been detailed in **Table 5.1**.

Design Standards (as appropriate) have been further elaborated under the following heads.

- Geometric Design.
- Drainage.
- Grade Separated Structure.

5.2 Factors Considered in Planning

The Important Factors considered in the Planning of Elevated Corridor Facility are detailed below.

- Elevated Corridor Facility has been planned in such a way that it blends well with the existing Transport Infrastructure Facilities in the City.
- Elevated Corridor Facility has been planned in such a way that it not only provides Traffic Relief but also enhances the Capacity of the Corridor, provides Safety to the Road Commuters.
- Elevated Structure should have no / minimum impact on the existing environment and its surroundings.

5.3 Design Standards Related to Geometric Design

Design Standards related to Road Geometric along with the suggested Design Values / Standards and Recommended Values based on Site Conditions and Data Analysis are detailed in **Table 5.1**.

Table 5.1
Geometric Design Standards

Sl. No.	Design Parameters	Reference Code / Design Values
1.	Design Speed	IRC: 69 – 1977 – "Space Standards for Roads in Urban Area IRC: 86 – 1983 – "Geometric Design Standards for Ur Roads in Plains". IRC: 92 – 1985 – "Guidelines for the Design of Interchange Urban Areas". The Grade Separator and Surface Level Roads have b designed for an Operating Speed of 40 kmph.
2.	Geometric Design Standards	
	• Carriageway Width	Four lanes divided bi directional Carriageway
	• Median	1m
	• Footpath at grade level	2.5m
	• Camber (bi directional)	1 in 40 (2.5%) for Paved Carriageway
	• Vertical Gradient	Limited to 1 in 20 (5%)
	• Vertical Clearance	5.5m
	• Horizontal Curves	IRC: 38 – 1988 – "Guidelines for Design of Horizontal Cur for Highways and Design Tables" (First Revision).
	• Vertical Curves	IRC: SP: 23 – 1983 – "Vertical Curves for Highways".
	• At Grade Junction	IRC: SP: 41 – 1994 – "Guidelines on Design of At Gra Intersections in Rural and Urban Areas".

5.4 Design Standards Related to Drainage

Drainage of Storm Water collected on the Elevated Corridor and at Surface Level Roads shall be essentially based on the Guidelines given in IRC: SP: 42 – 1994 – "Guidelines on Road Drainage" and in IRC: SP: 50 – 1999 – "Guidelines on Urban Drainage". The Suggested Design Values / Standards and Recommended Values based on Site Conditions are detailed in **Table 5.2**.

Table 5.2
Design Standards Related to Drainage

Design Parameters	Reference Code / Design Values
• Camber	1 in 40 (2.5%) (bi directional) for Carriageway
• Longitudinal Gradient	Minimum 1 in 300 (0.3%)
• Drain Type	RCC Box Drain covered with Precast RCC Slab

5.5 Design Standards Related to Grade Separated Structure

The Design Standards and Loading considered for Elevated Structure shall be as stipulated in Latest IRC Codes / Special Publications supplemented by appropriate MoRT&H Circulars and / or IS codes.

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5.6 Design Life

As per IRC: 92 – 1985 – "Guidelines for the Design of Interchanges in Urban Areas", fo the Purpose of Traffic Projection a 20 year Horizon Period has been considered. Th Elevated Corridor and Surface Level Roads have been designed to cater to the traffi anticipated in the next 20 years.

5.7 Design Service Volume

As per IRC: 106 – 1990 "Guidelines for Capacity of Urban Roads in Plain Areas", Desig Service Volumes corresponding to LOS 'C' have been adopted for Design of Urban Roads.

Design Service Volumes for Arterial and Sub Arterial Roads corresponding to LOS 'C' are presented in **Table 5.3**.

Table 5.3
Design Service Volumes

Sl. No.	Type of Carriageway	Design Service Volume, PCU/hr.		Design Service Volume, PCU/	
		Arterial	Sub arterial	Arterial	Sub arteri
		LOS C	LOS C	LOS C	LOS C
1.	2 – Lane (One – way)	2400	1900	1200	950
2.	2 – Lane (Two – way)	1500	1200	750	600
3.	3 – Lane (One – way)	3600	2900	1200	967
4.	4 – Lane Undivided (Two – way)	3000	2400	750	600
5.	4 – Lane Divided (Two – way)	3600	2900	900	725
6.	6 – Lane Undivided (Two – way)	4800	3800	800	633
7.	6 – Lane Divided (Two – way)	5400	4200	900	700
8.	8 – Lane Divided (Two – way)	7200	--	900	--

(Source: IRC: 106 – 1990)

MANASA CONSULTANTS

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Chapter – 6

Concept Proposals

CHAPTER 9
PROJECT COST AND ECONOMIC EVALUATION

9.1 Rate Analysis

As part of Detailed Project Report (DPR), Rate Analysis of each of the Item has been prepared by adopting PW, P & IWTD SR 2012 – 13, Bangalore Circle and NHSR 2009 – 10, National Highways Circle, Bangalore. The Rates as given in PW, P & IWTD SR are to be enhanced by 8% and by 6% for the Rates given in NHSR for additional weightages for the Works to be executed under extra ordinary conditions for Bangalore Metropolitan Limits. Items not covered in NHSR / PW, P & IWTD SR have been based on Market Rates.

9.2 Detailed Cost Estimate

As part of DPR, Detailed Cost Estimate has been prepared for the Elevated Structure and Surface Level Roads based on Detailed Engineering Design.

Components

The Costs of Work have been worked out Component wise as below.

I. **Elevated Corridor Works** (Works to be taken under Turnkey Lump Sum Contract)
- Site Clearance and Dismantling.
- Surface Level Roads / Slip Roads.
- RCC Drain Works.
- Culverts across Road.
- Construction of Storm Water Drain.
- Diversion Roads.
- Obligatory Spans and Standard Spans of Elevated Corridor.
- Approaches to the Elevated Corridor.
- Electrical Works.
- Road Furniture and other Allied Works.

II. **Utility Shifting**
- BESCOM
- BWSSB

The Quantities of each of the Component have been assessed by making use of the Layout Plan, Longitudinal Sections, Cross Sections, Design Details and Engineering Drawings.

9.3 Project Cost

The Rates of the Various Items of Works have been analysed keeping in view the Basic Rates as per SR and their respective lead. Provision for Contingencies has been made as per normal practice.

To accommodate the proposed Elevated Corridor Scheme, 4819.257 Sqm of land needs to be acquired. The Abstract of the Project Cost is detailed in Table 9.1. Total Cost of the Project is **Rs. 21404.00 Lakh** including Utility Shifting and Land Acquisition Cost.

The Detailed Cost Estimate is presented in **Annexure A.9.1.**

Table 9.1
Abstract of Project Cost

Sl. No.	Particulars	Cost in Rs
1.	Site Clearance and Dismantling	87760
2.	Surface Level Roads / Slip Roads	1200700
3.	Drain Works	
	a. Road Side Drain	498100
	b. Culverts across Roads	52240
	c. Construction of Storm Water Drain	259360
4.	Diversion Road	379120
5.	Works for Obligatory Spans and Standard Spans of Elevated Corridor	11274800
6.	Approaches to the Elevated Corridor	8856000
7.	Median, Kerb and Compound at Grade Level	1743700
8.	Electrical Works	1440000
9.	Road Furniture and other Works	2677000
	Construction Cost	**152237500**
10.	Cost of Topographical Survey	25000
11.	Cost of Soil Investigation	252500
12.	Contingencies (@ 3% of Construction Cost)	0 - ~~4567125~~
13.	Cost for Consultancy Charges for DPR Preparation, Proof Checking and Project Management (@ 2.5% of Construction Cost)	3805937
14.	Utility Shifting Charges (@ 8% of Construction Cost)	12179000
15.	Expenditure towards Land Acquisition for an Area of 4819.257 Sqm	~~40967028~~
	Sub Total	**214034090**
16.	Miscellaneous and rounding off	~~5909~~
	Grand Total	**~~214040000~~**

Note: (Rs Two hundred, and four Crores only) ₹204,00,00,00

To work out the Land Acquisition Cost the following have been considered.

1. Land Rate: Rs. 5000/- per Sft. [as per Revised Estimated Market Value of Immovable Properties and Buildings within the Jurisdiction of Bommanahalli Sub Registrar Office, Page No. 351, Sl. No. 13 (i)].
2. Appreciation Rate per Annum: 12% of Total Land Value.
3. Statutory Allowance: 30% of Total Land Value.
4. Expenditure towards Staff Maintenance: 10% of (1 + 2 + 3).
5. Processing Fee: 1% of (1 + 2 + 3).
6. Expenditure towards Publication of Notification: Lump Sum Rs. 1000000/-

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Assistant Executive Engineer
Traffic Engineering Cell
Bruhat Bangalore Mahanagara Palike
Bangalore - 560 002.

Executive Engineer
Bruhat Bangalore Mahanagara Palike
Traffic Engineering Cell (Road Infra)
Bruhat Bangalore Mahanagara Palike
Bangalore - 560 002.

1. Cost of Land in Rs. = 5000 X 4819.257 X 10.76	25, 92, 75, 650/-
2. Appreciation per Annum in Rs. = 12% of 25, 92, 75, 650/-	3, 11, 13, 078/-
3. Statutory Allowance in Rs. = 30 % of 25, 92, 75, 650/-	7, 77, 82, 695/-
Total	**36, 81, 71, 424/-**
4. Expenditure towards Staff Maintenance in Rs. = 10% of 36, 81, 71, 423/-	3, 68, 17, 142/-
5. Processing Fee in Rs. = 1% of 36, 81, 71, 423/-	36, 81, 714/-
6. Expenditure towards Publication of Notification: Lump Sum Rs. 1000000/-	10, 00, 000/-
Grand Total	**40, 96, 70, 280/-**

9.4 Economic Evaluation

The Objective of Economic Evaluation is to determine the Feasibility of the Proposed Project in Terms of the Benefits likely to accrue to the Economy as a whole, thereby justifying its Implementation. Economic Appraisal is carried out within the broad framework of Cost Benefit Analysis, which attempts to compare the Investment incurred with the Benefits derived from the Project, in terms of its Contribution towards improving the Welfare of Road Users of Bangalore City.

To begin with, the Project Costs and Benefits under "without" and "with" Project Situations have been identified and valued in Financial Terms. These are converted into Economic Prices to remove Market Imperfections and to reflect the Resource Cost to the Economy. Economic Prices are Net of Taxes, Duties, Royalties or any other Element in the nature of Transfer Payments. The Benefits have been estimated by comparison of "with" and "without" Project Situations. The Annual Stream of Project Cost and Benefits in Economic Terms have been computed over the Analysis Period. The Results are presented in terms of Economic Internal Rate of Return (EIRR). The Resultant EIRR will be compared with the Accounting Rate of Return, considered as the minimum for Investment Decisions by the BBMP.

9.4.1 Estimation of Economic Costs

The Project Cost comprises of Capital Cost and Maintenance Cost. Capital Cost consists of Outlays for Construction of Elevated Corridor Structure, Traffic Diversion during Construction, Network Improvements for Efficient Movement of Traffic, Relocation of Utilities, Land Acquisition and Consultancy Charges. These Costs are computed in Financial Terms based on the Market Prices. The Financial Costs are converted into Economic Costs by applying Conversion Factor (0.8) recommended by International Funding Agencies and / or MoRT&H for Economic Evaluation of Transport Projects in India in recent years. All Prices have been kept at Constant Level (2012 – 13 Prices) throughout the Evaluation Period. The Capital Costs have been annually phased over the Construction Period as per Pre Determined Work Schedule.

The Maintenance Costs are Annually Recurring Costs. Both the Routine and Periodic Intervention Costs have been determined in Economic Prices. Maintenance Costs will be considered after the expiry of "Defect Liability Period of the Contractor", which is usually taken as 24 months. The Annual Stream of Costs for both Capital and Maintenance has been developed for the Analysis Period.

9.4.2 Estimation of Economic Benefits

The Estimation of User Benefits in terms of Time Savings and Vehicle Operating Cost Savings has been done as per IRC: SP – 30 "Manual on Economic Evaluation of Highway Projects in India". Other Assumptions made and References are indicated.

The Proposed Elevated Corridor Scheme will ease Congestion along 100ft. Inner Ring Road between Ejipura Main Road – Inner Ring Road Junction and Kendriya Sadana Junction and allow to and fro Vehicular Traffic between Ejipura Main Road – Inner Ring Road Junction and Kendriya Sadana Junction along Inner Ring Road to move without stopping at signals. This would eliminate / reduce Vehicular and Pedestrian Traffic Conflicts and Delays experienced by both Traffic using the Elevated Corridor and the At Grade Road.

The Future Traffic Flows and corresponding Delays at the Intersection have been estimated for both "without" and "with" Project Situations as part of the Traffic Analysis.

The Direct and Indirect Benefits accruing to the Users can be classified as

i. Savings in Idling Fuel Consumption at Intersection due to Reduction in Stopped Vehicular Delays.
ii. Savings in Travel Time due to Improved Speeds as a Result of Elimination / Reduction of Delays.
iii. Savings in Fuel due to Improved Travel Speeds.
iv. Reduction of Accidents.
v. Improvement in the Environmental Conditions of Existing and Surrounding Areas.

Direct Benefit Categories viz. (i), (ii) and (iii) have been estimated in Monetary Terms and used for the Viability Analysis. Since Categories (iv) and (v) are Indirect Benefits and are difficult to quantify hence they are excluded from the Analysis.

9.4.2.1 Savings in Idling Fuel Consumption

At Signalized Intersections, Stoppages during the 'Red Phase' result in Extra Fuel Consumption when the Vehicle is idling. Since the Proposed Elevated Corridor Scheme will allow traffic to move without stopping at signals, the Delay due to Stoppages will be eliminated for Traffic using the Elevated Corridor and reduced for the remaining At Grade Traffic at the Intersection. This will result in Savings in Idling Fuel Consumption.

The Annual Mode wise Idling Costs have been estimated for "without" and "with" Project Situations to obtain the Savings in Idling Fuel Consumption. These are based on Delays faced by Traffic during each hour and the Standard Idling Fuel Efficiency Norms for Various Vehicle Types. Idle Fuel Consumption of Various Modes of Vehicles based on RUCS is detailed in **Table 9.2**.

Table 9.2
Idle Fuel Consumption Rates

Vehicle Type	Fuel Consumption in cc / minute
Cars	12.0
Buses / Trucks	35.4
Scooters / Motor Cycles	2.0
Auto Rickshaw	2.5

9.4.2.2 Savings in Cruise Fuel Consumption

In the existing scenario, due to the Formation of Longer Queue Length at Signalized Intersections, Vehicles are forced to move at slow speeds, which are sub optimal from mileage point of view. This Crawl Length is taken as equal to Queue Length. Since the Proposed Elevated Corridor Scheme will allow traffic to move with Reduction in Queue Length, which is taken as equal to the Percentage of Traffic excluding that carried by the Elevated Corridor hence this will result in Savings in Cruise Fuel Consumption.

The Annual Mode wise Cruise Costs have been estimated for "without" and "with" Project Situations to obtain the Savings in Cruise Fuel Consumption. These are based on Queues formed by Traffic during each hour, and the Standard Cruising Fuel Efficiency Norms for Various Vehicle Types. Cruise Fuel Consumption of Various Modes of Vehicle based on RUCS is detailed in **Table 9.3**.

Table 9.3
Fuel Consumption Equations for Estimation of Vehicle Operating Cost

Two Wheeler	$FC = 3.38 + 549.57/V + 0.00436\ V^2$
Auto Rickshaw	$FC = 4.13 + 549.57/V + 0.00436\ V^2$
New Brand Car	$FC = 21.85 + 504.15/V + 0.004957\ V^2$
Old Brand Car	$FC = 10.35 + 1675.52/V + 0.0133\ V^2$
LCV	$FC = 21.28 + 1615.327/V + 0.0245\ V^2$
Truck	$FC = 44.08 + 3904.64/V + 0.0207\ V^2$
Bus	$FC = 32.97 + 3904.64/V + 0.0207\ V^2$

9.4.2.3 Savings in Time

The Annual Time Delay Costs for each Vehicle Type have been estimated on the basis of the Value of Time for Users of Different Modes. The Value of Time (VOT) for different Users is based on available studies carried out for Bangalore City as detailed in **Table 9.4**.

Table 9.4
Vehicle Occupancy and Value of Time

Type	Occupancy	Value of Passenger Time (Rs. / hour)
Two Wheeler	1.20	50
Auto	2.40	60
Car / Taxi / Jeep	1.70	120
Truck / Tempo	2.00	30
Bus / Mini Bus	24.00	30

9.4.2.4 Savings in Fuel Cost

Vehicle Speeds at Intersections are affected due to Platoon Formations and Stoppages during Red Phase of Signal Time, thus resulting in Higher Vehicle Operating Costs. The Difference in Fuel Costs incurred by Vehicles while traversing the intersection with and without Elevated Corridor Scheme has been estimated to obtain the Annual Savings in Fuel at Intersections.

9.4.2.5 User Benefits

With the Implementation of Elevated Corridor Scheme, Benefits have been assessed by comparing the User Costs in the 'with' and 'without' Project Scenario. First year Benefit in the Post Elevated Corridor Scenario is **Rs. 6750.96 Lakh**. Estimated Annual User Costs and Savings on Elevated Corridor are given in **Annexure A.9.2**.

9.5 Economic Appraisal

The Annual Streams of Costs and Benefits have been compared to determine the Annual Stream of Net Benefits of the Project. The Economic Viability has been measured in terms of Economic Internal Rate of Return (EIRR) by applying the Discounted Cash Flow (DCF) Technique to the Annual Stream of Net Benefits of the Project.

EIRR, as a Simple Index of Economic Feasibility, has proven to be a useful tool in comparing the different alternatives and has been used for Evaluation. The EIRR is compared with the Accounting Rate of Return to assess the Economic Viability of the Project. The Accounting Rate of Return is generally taken as 15% for Infrastructure Projects in India.

9.5.1 Sensitivity Analysis

A Sensitivity Analysis has been performed to study the Impact of Changes in the main variables on the EIRR of the Project and to assess the Robustness of the Project. Changes in main Determinants include

- Increase in Project Cost by 10%.
- Decrease in Project Benefits by 10%.
- Increase in Project Cost by 10% and Decrease in Project Benefits by 10%.

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Results of Sensitivity Analysis incorporating all the Determinants as detailed above are summarized in **Table 9.5**. From the Table it can be seen that Project is still viable, with Increase in Cost at 10% and Decrease in Benefit by 10%, as EIRR is more than 15%.

Table 9.5
Summary of Sensitivity Analysis

Scenario	At the End of 2033	
	EIRR (%)	NPV (Rs. Lakh)
Base Case with Time Savings	• 31.48	• 28429.20
With Time Savings		
10% Increase in Cost	• 29.50	• 26648.51
10% Decrease in Benefits	• 29.30	• 23805.59
Combination of the above two	• 27.41	• 22024.90

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Annexure A.9.1

Detailed Cost Estimate

BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road – Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100f Inner Ring Road, Koramangala, Bangalore

Abstract of Detailed Cost Estimate

Sl. No.	Particulars	Cost in Rs.
1	Site Clearance and Dismantling	87760
2	Surface Level Roads / Slip Roads	1200700
3	Drain Works	
	a. Road Side Drain	498100
	b. Culverts across Roads	52240
	c. Construction of Storm Water Drain	259360
4	Diversion Road	379120
5	Works for Obligatory Span and Standard Span of Elevated Corridor	11274800
6	Approaches to the Elevated Corridor	885600
7	Median, Kerb and Compound at Grade Level	174370
8	Electrical Works	144000
9	Road Furniture and other Works	267700
	Construction Cost	**15223750**
10	Cost of Topographical Survey	2500
11	Cost of Soil Investigation	25250
12	Contingencies (@ 3% of Construction Cost)	456712
13	Cost for Consultancy Charges for DPR Preparation, Proof Checking and Project Management (@ 2.5% of Construction Cost)	3805937
14	Utility Shifting Charges (@ 8% of Construction Cost)	1217900
15	Expenditure towards Land Acquisition for an Area of 4819.25 Sqm 35,50,00,625	40967028
	Sub Total	**214034090**
16	Miscellaneous and rounding off	590
	Grand Total	**214040000**

(Two hundred and four crores only) 204,00,00,

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BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Detailed Cost Estimate

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
1.00	SITE CLEARANCE AND DISMANTLING								
1.01	KSRRB 200-1: Cutting of trees girth from 300mm to 600mm including cutting of trunks, branches and removal of stumps stacking of serviceable materials with all lead & lift, earth filling in the depressions / pit, labour charges complete as per specifications. MoRT&H Specification Clause No.201.	Each							
	(P.No.144, I.No.18.1 of PW,P&IWTD S.R 2012-13)				--	--	30	135.00	4050.00
1.02	KSRRB 200-2: Cutting of trees girth from 600mm to 900mm including cutting of trunks, branches and removal of stumps stacking of serviceable materials with all lead & lift, earth filling in the depressions / pit, labour charges complete as per specifications. MoRT&H Specification Clause No.201.	Each							
	(P.No.144, I.No.18.2 of PW,P&IWTD S.R 2012-13)				--	--	61	270.00	16470.00
1.03	KSRRB 200-3: Cutting of trees girth from 900mm to 1800mm including cutting of trunks, branches and removal of stumps stacking of serviceable materials with all lead & lift, earth filling in the depressions / pit, labour charges complete as per specifications. MoRT&H Specification Clause No.201.	Each							
	(P.No.144, I.No.18.3 of PW,P&IWTD S.R 2012-13)				--	--	85	672.84	57191.00
1.04	KSRRB 200-4: Cutting of trees girth from 1800 to 2700mm including cutting of trunks, branches and removal of stumps stacking of serviceable materials with a lead of 100 metres, earth filling in the depressions / pit, labour charges complete as per specifications. MoRT&H Specification Clause No.201.	Each							
	(P.No.144, I.No.18.4 of PW, P&IWTD SR 2012-13)				--	--	71	1123.20	79747.00
1.05	KSRRB 200-4: Cutting of trees girth from 2700mmand above including cutting of trunks, branches and removal of stumps stacking of serviceable materials with a lead of 100 metres, earth filling in the depressions / pit, labour charges complete as per specifications. MoRT&H Specification Clause No.201.	Each							
	(P.No.144, I.No.18.5 of PW, P&IWTD SR 2012-13)						39	2694.60	105089.40

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
1.06	KSRRB M200-12.1. **Dismantling of existing structures** like culverts, Bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceble material and stacking the serviceable material with all lifts complete as per specifications. i) Lime/Cement Concrete. I.By Manual means, A. Lime Concrete, Cement Concrete Grade **M-10 & below PCC**	Cum							
	(P.No.145, I.No.18.17 of PW,P&IWTD S.R 2012-13)								
	LHS								
	Ch:100.00 to 450.00		1	350.00	0.90	0.10	31.50		
	Ch:1974.50 to 2012.75		1	38.25	0.90	0.10	3.44		
	Ch:2280.00 to 2670.00		1	390.00	0.90	0.10	35.10		
	Ch:2400.00 to 2670.00		1	270.00	0.90	0.10	24.30		
	RHS								
	Ch:0.00.00 to 450.00		1	450.00	0.90	0.10	40.50		
	Ch:1980.00 to 2130.00		1	150.00	0.90	0.10	13.50		
	Ch:2280.00 to 2700.00		1	420.00	0.90	0.10	37.80		
	For Drain Bed								
	LHS								
	Ch:100.00 to 450.00		2	350.00	2.10	0.10	147.00		
	Ch:2280.00 to 2670.00		2	390.00	2.10	0.10	163.80		
	RHS								
	Ch:0.00.00 to 450.00		2	450.00	2.10	0.10	189.00		
	Ch:1980.00 to 2130.00		2	150.00	2.10	0.10	63.00		
	Ch:2280.00 to 2700.00		2	420.00	2.10	0.10	176.40		
							925.34		
						Say	**926.00**	230.04	**213017.00**
1.07	KSRRB M200-12.2. **Dismantling of existing structures** like culverts, Bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceble material and stacking the serviceble material and serviceble material with all lifts complete as per specifications. i) Lime/Cement Concrete.I.By Manual means, B. Cement Concrete Grade **M-15 & M-20 PCC**	Cum							
	(P.No.145, I.No.18.18 of PW,P&IWTD S.R 2012-13)								
	Compound Plinth & Coping		2	2068.25	0.45	0.10	186.14		
	Footpath								
	LHS		1	920.00	2.00	0.15	276.00		
	RHS		1	1046.00	2.00	0.15	313.80		
							775.94		
						Say	**776.00**	276.48	**214548.00**

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Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
1.08	KSRRB M200-15.2. **Dismantling of existing structures** like culverts, Bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceble material and stacking the serviceble material with all lifts complete as per specifications. ii) Dismantling Stone Masonary **B. Rubble Stone Masonry, in Cement Mortar. SSM**	Cum							
	(P.No.146, I.No.18.27 of PW,P&IWTD S.R 2012-13)								
	For Drain								
	LHS								
	Ch:100.00 to 450.00		2	350.00	0.45	0.60	189.00		
	Ch:2280.00 to 2670.00		2	390.00	0.45	0.60	210.60		
	RHS								
	Ch:0.00.00 to 450.00		2	450.00	0.45	0.60	243.00		
	Ch:1980.00 to 2130.00		2	150.00	0.45	0.60	81.00		
	Ch:2280.00 to 2700.00		2	420.00	0.45	0.60	226.80		
	For Compound								
	Sub Structure (LHS)		1	740.00	0.75	0.60	333.00		
	RHS		1	1020.00					
	Super Structure		1	740.00	0.45	2.00	666.00		
							1949.40		
						Say	**1950.00**	183.60	**358020.00**
1.09	**Removing B.S.Slab of Drain and Stacking**	Sqm							
	(P.No.28, I.No.5.32 of PW,P&IWTD S.R 2012-13)								
	Removing of Drain Precast -Slab								
	LHS								
	Ch:100.00 to 450.00		1	350.00	1.00	--	350.00		
	RHS								
	Ch:0.00.00 to 450.00		1	450.00	1.00	--	450.00		
	Ch:1980.00 to 2130.00		1	150.00	1.00	--	150.00		
	Ch:2280.00 to 2700.00		1	420.00	1.00	--	420.00		
							1370.00		
						Say	**1370.00**	44.47	**60930.00**
1.10	KSRRB 200-27 Dismantling **Kerb stone channel by manual means including and** disposal of dimantled material with all lifts and complete as per specifications. MoRT&H Specification No. 202	Rmt							
	(P.No.147, I.No.18.50 of PW, P&IWTD S.R 2012-13)								
	LHS		1	778.25	--	--	778.25		
	RHS		1	1220	--	--	1220		
	Median		2	2700	--	--	5400		
							7398.25	11.63	86053.48
1.11	KSRRB 200-23.1: **Dismantling of flexible pavements** and disposal of dismantled materials– stacking serviceable and unserviceable materials seperately complete as per specifications **II. By Mechanical Means: A. Bituminous courses.** MoRT&H Specification No. 202.	Cum							
	(P.No.147, I.No.18.46 of PW, P&IWTD S.R 2012-13)								
			1	2580.00	23.00	0.15	8901.00		
						Say	8901.00	155.52	~~1384284.00~~

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Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
1.12	KSRRB 200-22.2: Dismantling of flexible pavements and disposal of dismantled materials upto a lead of 1000 metres, stacking serviceable and unserviceable materials seperately complete as per specifications **I. By Manual Means: B. Granular courses.** MoRT&H Specification No. **202.**	Cum							
	(P.No.147, I.No.18.45 of PW, P&IWTD S.R 2012-13)								
			1	2580.00	23.00	0.30	17802.00		
						Say	17802.00	299.16	5325646.00
	Dismantling of Existing Culverts								
1.13	KSRRB M200-12.1. **Dismantling of existing structures** like culverts, Bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceble material, disposal of unserviceble material and stacking the serviceable material with all lifts complete as per specifications. i) Lime/Cement Concrete.I.By Manual means, A. Lime Concrete, Cement Concrete Grade **M-10 & below PCC**	Cum							
	(P.No.145, I.No.18.17 of PW,P&IWTD S.R 2012-13)								
	Bed Concrete								
	3m Length	3	1	3.00	2.10	0.10	1.89		
	5m Length	11	1	5.00	2.10	0.10	11.55		
	7m Length	2	1	7.00	2.10	0.10	2.94		
	8m Length	1	1	8.00	2.10	0.10	1.68		
	14m Length	1	1	14.00	2.10	0.10	2.94		
	30m Length	1	1	30.00	2.10	0.10	6.30		
							27.30		
						Say	28.00	230.04	6441.00
1.14	KSRRB M200-15.2. **Dismantling of existing structures** like culverts, Bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceble material and stacking the serviceable material with all lifts complete as per specifications. ii) Dismantling Stone Masonary **B. Rubble Stone Masonry, in Cement Mortar. SSM**	Cum							
	(P.No.146, I.No.18.27 of PW,P&IWTD S.R 2012-13)								
	SSM								
	3m Length	3	2	3.00	0.45	1.00	8.10		
	5m Length	11	2	5.00	0.45	1.00	49.50		
	7m Length	2	2	7.00	0.45	1.00	12.60		
	8m Length	1	2	8.00	0.45	1.00	7.20		
	14m Length	1	2	14.00	0.45	1.00	12.60		
	30m Length	1	2	30.00	0.45	1.00	27.00		
							117.00		
						Say	117.00	183.60	21481.00

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Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
1.15	KSRRB M200-13.1. **Dismantling of existing structures** like culverts, Bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts complete as per specifications. By mechanical means, **A. Cement concrete Grade M-15 & M-20.**	Cum							
	(P.No.145, I.No.18.20 of PW,P&IWTD S.R 2012-13)								
	Deck Slab								
	3m Length	3	1	3.00	1.90	0.30	5.13		
	5m Length	11	1	5.00	1.90	0.30	31.35		
	7m Length	2	1	7.00	1.90	0.30	7.98		
	8m Length	1	1	8.00	1.90	0.30	4.56		
	14m Length	1	1	14.00	1.90	0.30	7.98		
	30m Length	1	1	30.00	1.90	0.30	17.10		
							74.10		
						Say	**75.00**	317.52	**23814.00**
1.16	KSRRB M200-17.1. **Dismantling of existing structures** like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T & P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts complete as per specifications. v) **Steel Work** in all types of sections upto a Height of 5m above plinth level excluding cutting of rivet A. including dismembering. MoRT&H Specification No.202	MT							
	(P.No.146, I.No.18.33 of PW,P&IWTD S.R 2012-13)								
	Consider 100kg/Cum for Slab		1	75.00			7.50		
						Say	**7.50**	865.08	**6488.00**
	Dismantling of Existing Storm Water Drain Culverts & Retaining Wall								
1.17	KSRRB M200-12.1. **Dismantling of existing structures** like culverts, Bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceble material and stacking the serviceable material with all lifts complete as per specifications. i) Lime/Cement Concrete.I.By Manual means, A. Lime Concrete, Cement Concrete Grade **M-10 & below PCC**	Cum							
	(P.No.145, I.No.18.17 of PW,P&IWTD S.R 2012-13)								
	CH:H 1740 to CH:H 1840								
	Retaining Wall Bed		4	5.00	2.00	0.15	6.00		
	Culvert Bed		1	25.00	20.00	0.15	75.00		
							81.00		
						Say	**81.00**	230.04	**18633.00**

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋಜನೆ-ಬೆ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
1.18	KSRRB M200-13.1. **Dismantling** of existing structures like culverts, Bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceble material and stacking the serviceble material with all lifts complete as per specifications. II. By mechanical means, **A. Cement concrete Grade M-15 & M-20.**	Cum							
	(P.No.145, I.No.18.20 of PW,P&IWTD S.R 2012-13)								
	Deck Slab		1	25.00	20.00	0.40	200.00		
	I Girder		8	20.00	0.50	1.00	80.00		
	Abutment		2	25.00	0.60	3.50	105.00		
	Retaining Wall Stem		4	5.00	0.30	4.00	24.00		
	Retaining Wall Footing		4	5.00	1.50	0.50	15.00		
							424.00		
						Say	424.00	317.52	134628.00
1.19	KSRRB M200-17.1. **Dismantling of existing structures** like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T & P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts complete as per specifications. v) **Steel Work** in all types of sections upto a Height of 5m above plinth level excluding cutting of rivet A. including dismembering. MoRT&H Specification No.202	MT							
	(P.No.146, I.No.18.33 of PW,P&IWTD S.R 2012-13)								
	Consider 100kg/Cum			424.00			42.40		
						Say	43.00	865.08	37198.00
1.20	KSRRB M100-4.2. **Haulage** of materials by tipper Including cost of loading, unloading and stacking complete as per specifications. MoRT&H Chapter 1 Case-I : Surface Road for SSM masonry of Drain & Compound Wall	Cum							
	(P. No.142&148 of PW,P&IWTD S.R 2012-13)								
	Qnty same as item No. 7.07, 7.13								
	Total Qty =2748+117 = 2865 Cum								
	For 20Km RS. 2.00 X 1.8 X 20 = (72.00 + 62.20)X1.08=144.94		1	2067.00			2067.00	144.94	299583.00
1.21	KSRRB M100-4.2. **Haulage** of materials by tipper Including cost of loading, unloading and stacking complete as per specifications. MoRT&H Chapter 1 Case-I : Surface Road	Cum							
	(P. No.142&148 of PW,P&IWTD S.R 2012-13)								
	Qnty same as item No. 7.05,7.06,(7.08 X 0.10),(7.09 X 0.45 X 0.20),7.12,7.14,7.16 & 7.17								
	For 20Km Rs. 2.00 X 1.28X 20 = (52.00 + 62.20)X1.08=122.47								
			1	2447.00			2447.00	122.47	299689.00

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ಬಿಡುಗಡೆಗೊಳಿಸಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
1.22	KSRRB M100-4.2. **Haulage of materials by** tipper Including cost of loading, unloading and stacking complete as per specifications. MoRT&H Chapter 1 For Steel								
	(P. No.142&148, Item No.17.3 of PW,P&IWTD S.R 2012-13)								
	Qnty same as item No.7.15 + 7.18								
	For 20Km Rs. 2.00 X 7.85 X 20 = (52.00 + 103.70)X1.08=451.12		1	50.50			50.50	451.12	22781.00
									8775781.88
1.23	Miscellaneous and Rounding off								218.12
				Total Cost of Site Clearance and Dismantling					8776000.00

Assistant Executive Engineer
Traffic Engineering Cell,
Bruhath Bangalore Mahanagara Palike,
Bangalore - 560 002.

Executive Engineer
Traffic Engineering Cell (Road Infra)
Bruhat Bangalore Mahanagara Palike
Bangalore - 560 002.

ದಾಖಲೆಯನ್ನು ಮಾಡಿತಿ ಪಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬೆಸಂ-ಬೆ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Detailed Cost Estimate

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
2.00	SURFACE LEVEL ROADS/ SLIP ROADS								
2.01	KSRRB M300-11:Excavation for road way in soil by mechanical means including cutting and pushing the earth to site of embankment upto a distance of 100 meters (average lead 50 meters), including trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections complete as per specifications. MoRT&H Specification No. 301	Cum							
	(P.No.151, I.No.19.11 of PW,P&IWTD S.R 2012-13)								
	Surface level Roads								
	LHS								
	Ch-90 to 210		1	Area 402.03		0.59	237.20		
	Ch-210 to 450		1	790.05		0.59	466.13		
	Ch-480 to 1150		1	665.02		0.59	392.36		
	Ch-1170 to 1290		1	155.73		0.59	91.88		
	Ch-1302 to 1340		1	49.12		0.59	28.98		
	Ch-1390 to 1520		1	29.03		0.59	17.13		
	Ch-1550 to 1740		1	121.40		0.59	71.63		
	Ch-1740		1	3.73		0.59	2.20		
	Ch- 1760 to 1970		1	271.19		0.59	160.00		
	Ch-2100 to 2300		1	410.13		0.59	241.98		
	Ch-2400		1	3.94		0.59	2.32		
	Ch-2420 to 2650		1	888.02		0.59	523.93		
	RHS								
	Ch-0 to 200		1	1383.40		0.59	816.21		
	Ch-200 to 450		1	1384.48		0.59	816.84		
	Ch -480 to 530		1	36.89		0.59	21.77		
	Ch-540 to 580		1	24.68		0.59	14.56		
	Ch-590		1	9.34		0.59	5.51		
	Ch-630		1	1.56		0.59	0.92		
	Ch-640 to 690		1	41.91		0.59	24.73		
	Ch-700 to 780		1	70.05		0.59	41.33		
	Ch-790 to 880		1	74.08		0.59	43.71		
	Ch-900 to 930		1	33.00		0.59	19.47		
	Ch-940 to 1070		1	279.32		0.59	164.80		
	Ch-1080 to 1390		1	456.81		0.59	269.52		
	Ch-1410 to 1540		1	182.30		0.59	107.56		
	Ch-1540 to 1680		1	146.46		0.59	86.41		
	Ch-1690 to 1740		1	70.19		0.59	41.41		
	Ch-1760 to 1850		1	89.81		0.59	52.99		
	Ch-1910 to 2150		1	520.99		0.59	307.38		
	Ch-2210 to 2420		1	512.18		0.59	302.19		
	Ch-2430 to 2680		1	820.72		0.59	484.22		
							5857.26		
						Say	5857.50	70.20	411197.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋಜನೆ-ಕೆ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ.

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
2.02	KSRRB 300-50. Scarifying bituminous course 50mm to 75mm thick along with premix carpet / surface dressing by road roller attached with scarifier without disturbing the base and stacking the debris within a lead of 100 metres including cost of all labour charges, HOM of machineries complete as per specifications.MORT&H Chapter 3	Sqm							
	(P. No.156 I No 19.56 of PW, P & IWTD S.R 2012-13)								
	For Pedestrian Crossing								
	Kendriya Sadana Junction		2	34.00	3.00	-	204.00		
	Koramangala BDA Complex Junction		2	21.50	3.00	-	129.00		
	Koramangala 5th Block Junction		2	12.30	3.00	-	73.80		
	Koramangala 60 feet Road Junction		2	12.50	3.00	-	75.00		
	Koramangala 8th Main Junction		2	15.50	3.00	-	93.00		
	Sony world Junction		2	20.13	3.00	-	120.78		
	Ejipura Junction		2	18.30	3.00	-	109.80		
							805.38		
						Say	805.50	23.76	19139.00
2.03	KSRB 14.6-1. Providing and laying heavy duty cobble stones 75mm thick interlock pavers, using cement and course sand for manufacture of blocks of approved size, shape and colour with a minimum compressive strength of 281 kg per sqm over 50mm thick sand bed (average thickness) and compacting with plate vibrator having 3 tons compaction force thereby forcing part of sand underneath to come up in between joints, final compaction of paver surface joints into its final level, including cost of materials, labour and HOM of machineries complete as per specification. Specification No. KBS	Sqm							
	(P. No.109 I No 14.7 of PW, P & IWTD S.R 2012-13)								
	For Pedestrian Crossing								
	Qty Same as Item No-1.02						805.50		
						Say	805.50	763.56	615048.00
2.04	KSRRB M100-4.2. **Haulage** of materials by tipper Including cost of loading, unloading and stacking complete as per specifications. MoRT&H Chapter 1 Case-I : Surface Road	Cum							
	(P. No.142&148 of PW, P&IWTD S.R 2012-13)								
	Qnty same as item no 1.01								
	For 20Km Rs. 2.00 X 1.28 X 20 = (52.00 + 62.20)X1.08=122.47		1	5857.50			5857.50	122.47	717380.00
2.05	Providing and fixing **RCC Precast Cover slab of 100mm thick** for drain in cement concrete 1:1.5:3 using graded granite jelly 20mm and down size with steel reinforcement, including form work, lift charges, curing and concrete finished surfaces on both sides etc, complete and as per the directions of Engineer in Charge.	Sqm							
	(Data Rate)								
	For Pedestrian Crossing								
	Kendriya Sadana Junction		4	34.00	0.30	-	40.80		
	Koramangala BDA Complex Junction		4	21.50	0.30	-	25.80		
	Koramangala 5th Block Junction		4	12.30	0.30	-	14.76		
	Koramangala 60 feet Road Junction		4	12.50	0.30	-	15.00		
	Koramangala 8th Main Junction		4	15.50	0.30	-	18.60		
	Sony world Junction		4	20.13	0.30	-	24.16		
	Ejipura Junction		4	18.30	0.30	-	21.96		
							161.08		
						Say	161.50	1489.00	240474.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಐ.ಎ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
2.06	KSRRB M300-55 Construction of **subgrade** and earthen shoulders with approved material gravel / murrum with all lifts & leads, transporting to site, spreading grading to required slope and compacted to meet requirement of Table 300-2 complete as per specifications (including cost of earth, watering charges & compaction by vibratory roller)	Cum							
	(P.No.157, I.No.19.62 of PW,P&IWTD S.R 2012-13)								
	Surface level Roads								
	Standard Span Pier		78	27.20	1.00	0.50	1060.80		
	Obligatory Span Pier		14	38.8	1.00	0.50	271.60		
	Obligatory Pier 25m Span		3	33.20	1.00	0.50	49.80		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	1.00	0.50	27.20		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	1.00	0.50	77.60		
							1487.00		
						Say	1487.00	174.96	260166.00
2.07	KSRRB M400-7 Construction of **granular sub-base** by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per 400-2 For Grading I Material.	Cum							
	(P.No.165, I.No.20.6.1 of PW,P&IWTD S.R 2012-13)								
	Surface level Roads								
	LHS			Area					
	Ch-90 to 210		1	402.03		0.20	80.41		
	Ch-210 to 450		1	790.05		0.20	158.01		
	Ch-480 to 1150		1	665.02		0.20	133.00		
	Ch-1170 to 1290		1	155.73		0.20	31.15		
	Ch-1302 to 1340		1	49.12		0.20	9.82		
	Ch-1390 to 1520		1	29.03		0.20	5.81		
	Ch-1550 to 1740		1	121.40		0.20	24.28		
	Ch-1740		1	3.73		0.20	0.75		
	Ch- 1760 to 1970		1	271.19		0.20	54.24		
	Ch-2100 to 2300		1	410.13		0.20	82.03		
	Ch-2400		1	3.94		0.20	0.79		
	Ch-2420 to 2650		1	888.02		0.20	177.60		
	RHS								
	Ch-0 to 200		1	1383.40		0.20	276.68		
	Ch-200 to 450		1	1384.48		0.20	276.90		
	Ch -480 to 530		1	36.89		0.20	7.38		
	Ch-540 to 580		1	24.68		0.20	4.94		
	Ch-590		1	9.34		0.20	1.87		
	Ch-630		1	1.56		0.20	0.31		
	Ch-640 to 690		1	41.91		0.20	8.38		
	Ch-700 to 780		1	70.05		0.20	14.01		
	Ch-790 to 880		1	74.08		0.20	14.82		
	Ch-900 to 930		1	33.00		0.20	6.60		
	Ch-940 to 1070		1	279.32		0.20	55.86		
	Ch-1080 to 1390		1	456.81		0.20	91.36		
	Ch-1410 to 1540		1	182.30		0.20	36.46		
	Ch-1540 to 1680		1	146.46		0.20	29.29		
	Ch-1690 to 1740		1	70.19		0.20	14.04		
	Ch-1760 to 1850		1	89.81		0.20	17.96		
	Ch-1910 to 2150		1	520.99		0.20	104.20		
	Ch-2210 to 2420		1	512.18		0.20	102.44		

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Ch-2430 to 2680		1	820.72		0.20	164.14		
	Standard Span Pier		78	27.20	1.00	0.20	424.32		
	Obligatory Span Pier		14	38.80	1.00	0.20	108.64		
	Obligatory Pier 25m Span		3	33.20	1.00	0.20	19.92		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	1.00	0.20	10.88		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	1.00	0.20	31.04		
							2580.31		
							2581.00	1050.84	2712218.00
2.08	Providing laying, spreading and compacting graded stones aggregate to **wet mix macadam** specifications including premixing the material with water at OMC in mechanical mix plant carriage of mixed method of tipper to site, laying in uniform layers with paver in sub base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density complete as per Specifications. Clause 406 of MoRT&H.	Cum							
	(P.No.167, I.No.20.18 PW,P&IWTD S.R 2012-13)								
	Surface level Roads								
	LHS			Area					
	Ch-90 to 210		1	402.03		0.25	100.51		
	Ch-210 to 450		1	790.05		0.25	197.51		
	Ch-480 to 1150		1	665.02		0.25	166.26		
	Ch-1170 to 1290		1	155.73		0.25	38.93		
	Ch-1302 to 1340		1	49.12		0.25	12.28		
	Ch-1390 to 1520		1	29.03		0.25	7.26		
	Ch-1550 to 1740		1	121.40		0.25	30.35		
	Ch-1740		1	3.73		0.25	0.93		
	Ch- 1760 to 1970		1	271.19		0.25	67.80		
	Ch-2100 to 2300		1	410.13		0.25	102.53		
	Ch-2400		1	3.94		0.25	0.99		
	Ch-2420 to 2650		1	888.02		0.25	222.01		
	RHS								
	Ch-0 to 200		1	1383.40		0.25	345.85		
	Ch-200 to 450		1	1384.48		0.25	346.12		
	Ch -480 to 530		1	36.89		0.25	9.22		
	Ch-540 to 580		1	24.68		0.25	6.17		
	Ch-590		1	9.34		0.25	2.34		
	Ch-630		1	1.56		0.25	0.39		
	Ch-640 to 690		1	41.91		0.25	10.48		
	Ch-700 to 780		1	70.05		0.25	17.51		
	Ch-790 to 880		1	74.08		0.25	18.52		
	Ch-900 to 930		1	33.00		0.25	8.25		
	Ch-940 to 1070		1	279.32		0.25	69.83		
	Ch-1080 to 1390		1	456.81		0.25	114.20		
	Ch-1410 to 1540		1	182.30		0.25	45.58		
	Ch-1540 to 1680		1	146.46		0.25	36.62		
	Ch-1690 to 1740		1	70.19		0.25	17.55		
	Ch-1760 to 1850		1	89.81		0.25	22.45		
	Ch-1910 to 2150		1	520.99		0.25	130.25		
	Ch-2210 to 2420		1	512.18		0.25	128.05		
	Ch-2430 to 2680		1	820.72		0.25	205.18		
	Standard Span Pier		78	27.2	1.00	0.25	530.40		
	Obligatory Span Pier		14	38.8	1.00	0.25	135.80		
	Obligatory Pier 25m Span		3	33.2	1.00	0.25	24.90		
	Standard Span Pier		78	14.60	1.25	0.15	213.53		
	Obligatory Span Pier		14	27.0	1.95	0.15	110.57		
	Obligatory Pier 25m Span		3	24.20	1.25	0.15	13.61		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	1.00	0.25	13.60		

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
			2	14.60	1.25	0.15	5.48		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	1.00	0.25	38.80		
			4	27.00	1.95	0.15	31.59		
							3600.16		
						Say	3601.00	1059.48	3815187.00
2.09	Providing and applying **Primer coat with bitumen emulsion** on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.60 kg/sqm using mechanical means complete as per specifications. MoRT&H Specification No.502	Sqm							
	(P.No.172, I.No. 21.6 of PW,P&IWTD S.R 2012-13)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads			Area					
	LHS		1	402.03		--	402.03		
	Ch-90 to 210		1	790.05		--	790.05		
	Ch-210 to 450		1	665.02		--	665.02		
	Ch-480 to 1150		1	155.73		--	155.73		
	Ch-1170 to 1290		1	49.12		--	49.12		
	Ch-1302 to 1340		1	29.03		--	29.03		
	Ch-1390 to 1520		1	121.4		--	121.40		
	Ch-1550 to 1740		1	3.73		--	3.73		
	Ch-1740		1	271.19		--	271.19		
	Ch- 1760 to 1970		1	410.13		--	410.13		
	Ch-2100 to 2300		1	3.94		--	3.94		
	Ch-2400		1	888.02		--	888.02		
	Ch-2420 to 2650					--			
	RHS								
	Ch-0 to 200		1	1383.4		--	1383.40		
	Ch-200 to 450		1	1384.48		--	1384.48		
	Ch -480 to 530		1	36.89		--	36.89		
	Ch-540 to 580		1	24.68		--	24.68		
	Ch-590		1	9.34		--	9.34		
	Ch-630		1	1.56		--	1.56		
	Ch-640 to 690		1	41.91		--	41.91		
	Ch-700 to 780		1	70.05		--	70.05		
	Ch-790 to 880		1	74.08		--	74.08		
	Ch-900 to 930		1	33		--	33.00		
	Ch-940 to 1070		1	279.32		--	279.32		
	Ch-1080 to 1390		1	456.81		--	456.81		
	Ch-1410 to 1540		1	182.3		--	182.30		
	Ch-1540 to 1680		1	146.46		--	146.46		
	Ch-1690 to 1740		1	70.19		--	70.19		
	Ch-1760 to 1850		1	89.81		--	89.81		
	Ch-1910 to 2150		1	520.99		--	520.99		
	Ch-2210 to 2420		1	512.18		--	512.18		
	Ch-2430 to 2680		1	820.72		--	820.72		
	Standard Span Pier		78	27.2	2.25	--	4773.60		
	Obligatory Span Pier		14	38.8	2.95	--	1602.44		
	Obligatory Pier 25m Span		3	33.2	2.25	--	224.10		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	2.25	--	122.40		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	2.95	--	457.84		
							17107.94		
						Say	17108.00	42.83	732784.00

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬೆಂಗಳೂರು-ದಕ್ಷಿಣ-2, ಪಿ.ಡಬ್ಲ್ಯು.ಡಿ

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬೆಂಗಳೂರು-ದಕ್ಷಿಣ-2, ಪಿ.ಡಬ್ಲ್ಯು.ಡಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
2.10	KSRRB 3000 Filling Pot - holes and Patch Repairs with Bituminous Concrete, 40mm KSRRB M3000-5: Removal of all field material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation as per clause 500.3, back filling the pot holes with hot bituminous material as per clause 500.4, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2 complete as per specifications MoRT&H Specification No. 3004.2	Sqm							
	(P.No.262, I.No.35.5, PW, P & IWTD SR 2011-12)								
	Surface level Roads								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	--	22443.51		
	RHS					--			
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	--	22443.51		
	Up Ramp LHS & RHS		2	207.64	10.50	--	4360.44		
	Down Ramp LHS & RHS		2	203.44	10.50	--	4272.24		
	Obligatory Span								
	CH-1-442.29 to CH-1-482.291		1	40.00	25.00	--	1000.03		
	CH-1-919.428 to CH-1-949.43		1	30.00	25.00	--	750.05		
	CH-1-1147.24 to CH-1-1177.24		1	30.00	25.00	--	750.00		
	CH-1-1284.74 to CH-1-1314.74		1	30.00	25.00	--	750.00		
	CH-1-1379.80 to CH-1-1409.80		1	30.00	25.00	--	750.00		
	CH-1-1735.07 to CH-1-1765.07		1	30.00	25.00	--	750.00		
	CH-1-1949.30 to CH-1-1977.45		1	28.15	25.00	--	703.75		
	CH-1-2386.85 to CH-1-2436.85		1	50.00	25.00	--	1250.00		
	Battery limit								
	Towards Kendriya sadana		1	100.00	28.97	--	2897.00		
	Towards Domlur		1	100.00	26.86	--	2685.50		
	Towards Hosur Road - Sarjapur Road Juction		1	100.00	26.70	--	2670.00		
	Towards Sarjapur Road -Madiwala Road Juction		1	100.00	27.70	--	2770.00		
							71246.02		
	Consider 10% of the Qty for pot hole filling						7124.60		
						Say	7125.00	395.82	2820218.00
2.11	KSRRB 500-8 Providing and applying tack coat on granular surface treated with primer at 3 Kg per 10 sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of road surface) including cost of all materials, labour, HOM of machienries complete as per specifications.	Sqm							
	(P.No. 173 I.No. 21.8 of PW,P&IWTD S.R 2012-13)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads								
	Qty same as It No-1.06		17108.00				17108.00		
						Say	17108.00	20.76	355121.00

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
2.12	Providing and laying **bituminous macadam** on prepared surface with crushed coarse aggregates as per design mix formula for base / binding course including loading of aggregaters with F.E. loader, hot mixing of stone aggregates and bitumen in hot mix plant 40 tonne capacity, transporting the mixed material in tipper to paver and laying mixed materials with paver finisher to the required level and grade,rolling by power roller to acheive the deisred density, 50 / 75 mm compacted thickness with 3.3% bitumen but excluding cost of primer / tack coat with lead upto 1km including cost of all materials, labour, HOM of machineries complete as per specifications. MoRT&H Chapter 5 with 60 / 70 grade bitumen	Cum							
	(P.No.173 I.No. 21.11.2 of PW,P&IWTD S.R 2012-13)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.05	1122.18		
	RHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.05	1122.18		
	Up Ramp LHS & RHS		2	207.64	10.50	0.05	218.02		
	Down Ramp LHS & RHS		2	203.44	10.50	0.05	213.61		
	Obligatory Span								
	CH-1-442.29 to CH-1-482.291		1	40.00	25.00	0.05	50.00		
	CH-1-919.428 to CH-1-949.43		1	30.00	25.00	0.05	37.50		
	CH-1-1147.24 to CH-1-1177.24		1	30.00	25.00	0.05	37.50		
	CH-1-1284.74 to CH-1-1314.74		1	30.00	25.00	0.05	37.50		
	CH-1-1379.80 to CH-1-1409.80		1	30.00	25.00	0.05	37.50		
	CH-1-1735.07 to CH-1-1765.07		1	30.00	25.00	0.05	37.50		
	CH-1-1949.30 to CH-1-1977.45		1	28.15	25.00	0.05	35.19		
	CH-1-2386.85 to CH-1-2436.85		1	50.00	25.00	0.05	62.50		
	Standard Span Pier		78	27.20	2.25	0.05	238.68		
	Obligatory Span Pier		14	38.80	2.95	0.05	80.12		
	Obligatory Pier 25m Span		3	33.20	2.25	0.05	11.21		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	2.25	0.05	6.12		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	2.25	0.05	17.46		
							3364.76		
	Deduct Pier Excavation portion								
	Standard Span Pier	2	78	6.30	1.40	0.05	68.80		
	Obligatory Span Pier	2	14	10.7	2.10	0.05	31.46		
	Obligatory Pier 25m Span	2	3	9.30	1.40	0.05	3.91		
	Up Ramp and Down Ramp								
	Standard Span Pier	2	2	6.30	1.40	0.05	1.76		
	Up Ramp and Down Ramp								
	Obligatory Pier	2	4	10.70	1.00	0.05	4.28		
							110.20		
							3254.56		
						Say	3255.00	6455.69	21013268.00

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಟಿ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
2.13	KSRRB 200-7.Providing and applying tack coat on prepared black topped surfaces at 2.5 kg per 10 sqm,heating bitumen in boiler fitted with spray set (Excluding cleaning of road surface) incuding cost of all materials, labour,HOM of machineries complete as per specifications. MORTH/Chapter 5	Sqm							
	(P.No. 173 I.No.21.7 of PW,P&IWTD S.R 2012-13)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads (Over Exsting surface)								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	--	22443.51		
	RHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	--	22443.51		
	Up Ramp LHS & RHS		2	207.64	10.50	--	4360.44		
	Down Ramp LHS & RHS		2	203.44	10.50	--	4272.24		
	Obligatory Span								
	CH-1-442.29 to CH-1-482.291		1	40.00	25.00	--	1000.03		
	CH-1-919.428 to CH-1-949.43		1	30.00	25.00	--	750.05		
	CH-1-1147.24 to CH-1-1177.24		1	30.00	25.00	--	750.00		
	CH-1-1284.74 to CH-1-1314.74		1	30.00	25.00	--	750.00		
	CH-1-1379.80 to CH-1-1409.80		1	30.00	25.00	--	750.00		
	CH-1-1735.07 to CH-1-1765.07		1	30.00	25.00	--	750.00		
	CH-1-1949.30 to CH-1-1977.45		1	28.15	25.00	--	703.75		
	CH-1-2386.85 to CH-1-2436.85		1	50.00	25.00	--	1250.00		
	Standard Span Pier		78	27.20	2.25	--	4773.60		
	Obligatory Span Pier		14	38.80	2.95	--	1602.44		
	Obligatory Pier 25m Span		3	33.20	2.25	--	224.10		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	2.25	--	122.40		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	2.25	--	349.20		
							67295.26		
	Deduct Qty of Item No-1.07						17108.00		
							50187.26		
						Say	50188.00	17.12	859118.00
2.14	KSRRB M500-17. Providing and laying dense graded bituminous macadam with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder at 4.0 to 4.5% by weight of total mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignmnet, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H specification clause No. 500.7 complete in all respects as per specifications. Bitumen 60/70 MoRT&H Specification No. 507	Cum								
	(P.No. 175 I.No.21.19.2 of PW,P&IWTD S.R 2012-13)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.05	1122.18		
	RHS								

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.05	1122.18		
	Up Ramp LHS & RHS		2	207.64	10.50	0.05	218.02		
	Down Ramp LHS & RHS		2	203.44	10.50	0.05	213.61		
	Obligatory Span								
	CH-1-442.29 to CH-1-482.291		1	40.00	25.00	0.05	50.00		
	CH-1-919.428 to CH-1-949.43		1	30.00	25.00	0.05	37.50		
	CH-1-1147.24 to CH-1-1177.24		1	30.00	25.00	0.05	37.50		
	CH-1-1284.74 to CH-1-1314.74		1	30.00	25.00	0.05	37.50		
	CH-1-1379.80 to CH-1-1409.80		1	30.00	25.00	0.05	37.50		
	CH-1-1735.07 to CH-1-1765.07		1	30.00	25.00	0.05	37.50		
	CH-1-1949.30 to CH-1-1977.45		1	28.15	25.00	0.05	35.19		
	CH-1-2386.85 to CH-1-2436.85		1	50.00	25.00	0.05	62.50		
	Standard Span Pier		78	27.20	2.25	0.05	238.68		
	Obligatory Span Pier		14	38.80	2.95	0.05	80.12		
	Obligatory Pier 25m Span		3	33.20	2.25	0.05	11.21		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	2.25	0.05	6.12		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	2.25	0.05	17.46		
	Battery limit								
	Towards Kendriya sadana		1	100.00	28.97	0.05	144.85		
	Towards Domlur		1	100.00	26.86	0.05	134.28		
	Towards Hosur Road - Sarjapur Road		1	100.00	26.70	0.05	133.50		
	Towards Sarjapur Road -Madiwala road		1	100.00	27.70	0.05	138.50		
	For Pedestrian Crossing								
	Kendriya Sadana Junction		4	34.00	1.50	0.05	10.20		
	Koramangala BDA Complex Junction		4	21.50	1.50	0.05	6.45		
	Koramangala 5th Block Junction		4	12.30	1.50	0.05	3.69		
	Koramangala 60 feet Road Junction		4	12.50	1.50	0.05	3.75		
	Koramangala 8th Main Junction		4	15.50	1.50	0.05	4.65		
	Sony world Junction		4	20.13	1.50	0.05	6.04		
	Ejipura Junction		4	18.30	1.50	0.05	5.49		
							3956.16		
	Deduct Pier Excavation portion								
	Standard Span Pier	2	78	6.30	1.40	0.05	68.80		
	Obligatory Span Pier	2	14	10.70	2.10	0.05	31.46		
	Obligatory Pier 25m Span	2	3	9.30	1.40	0.05	3.91		
							104.16		
							3852.00		
						Say	3852.00	9183.46	35374673.00
2.15	KSRRB 200-7.Providing and applying tack coat on prepared black topped surfaces at **2.5 kg per 10 sqm**,heating bitumen in boiler fitted with spray set (Excluding cleaning of road surface) incuding cost of all materials, labour,HOM of machineries complete as per specifications. MORTH/Chapter 5	Sqm							
	(P.No. 173 I.No.21.7 of PW,P&IWTD S.R 2012-13)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads (Over BM & DBM)								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)	2	1	2137.48	10.50	--	44887.02		
	RHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)	2	1	2137.48	10.50	--	44887.02		
	Up Ramp LHS & RHS	2	2	207.64	10.50	--	8720.88		
	Down Ramp LHS & RHS	2	2	203.44	10.50	--	8544.48		
	Obligatory Span								

ದಾಖಲೆಯನ್ನು ಪೂರೈತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	CH-1-442.29 to CH-1-482.291	2	1	40.00	25.00	--	2000.05		
	CH-1-919.428 to CH-1-949.43	2	1	30.00	25.00	--	1500.10		
	CH-1-1147.24 to CH-1-1177.24	2	1	30.00	25.00	--	1500.00		
	CH-1-1284.74 to CH-1-1314.74	2	1	30.00	25.00	--	1500.00		
	CH-1-1379.80 to CH-1-1409.80	2	1	30.00	25.00	--	1500.00		
	CH-1-1735.07 to CH-1-1765.07	2	1	30.00	25.00	--	1500.00		
	CH-1-1949.30 to CH-1-1977.45	2	1	28.15	25.00	--	1407.50		
	CH-1-2386.85 to CH-1-2436.85	2	1	50.00	25.00	--	2500.00		
	Standard Span Pier	2	78	27.20	2.25	--	9547.20		
	Obligatory Span Pier	2	14	38.80	2.95	--	3204.88		
	Obligatory Pier 25m Span	2	3	33.20	2.25	--	448.20		
	Up Ramp and Down Ramp								
	Standard Span Pier	2	2	27.20	2.25	--	244.80		
	Up Ramp and Down Ramp								
	Obligatory Pier	2	4	38.80	2.25	--	698.40		
	For Pedestrian Crossing								
	Kendriya Sadana Junction	2	4	34.00	1.50	--	408.00		
	Koramangala BDA Complex Junction	2	4	21.50	1.50	--	258.00		
	Koramangala 5th Block Junction	2	4	12.30	1.50	--	147.60		
	Koramangala 60 feet Road Junction	2	4	12.50	1.50	--	150.00		
	Koramangala 8th Main Junction	2	4	15.50	1.50	--	186.00		
	Sony world Junction	2	4	20.13	1.50	--	241.56		
	Ejipura Junction	2	4	18.30	1.50	--	219.60		
	Battery limit								
	Towards Kendriya sadana	2	1	100.00	28.97	--	5794.00		
	Towards Domlur	2	1	100.00	26.86	--	5371.00		
	Towards Hosur Road - Sarjapur Road Juction	2	1	100.00	26.70	--	5340.00		
	Towards Sarjapur Road -Madiwala Road Juction	2	1	100.00	27.70	--	5540.00		
	Cross Roads								
	LHS								
	17th Main		1	50.00	9.14	--	457.00		
	Towards St.Johns (0.00 to 250.00)		1	250.00	29.57	--	7392.50		
	1st Cross		1	50.00	10.79	--	539.50		
	Road		1	50.00	11.57	--	578.50		
	7th Cross		1	50.00	7.60	--	380.00		
	4th Cross		1	50.00	9.22	--	461.00		
	Towards Sony World		1	50.00	17.90	--	895.00		
	Cross Road		1	50.00	5.40	--	270.00		
	Cross Road		1	50.00	6.07	--	303.50		
	7th Cross		1	50.00	3.49	--	174.50		
	Cross Road		1	50.00	2.33	--	116.50		
	4th Cross		1	50.00	4.34	--	217.00		
	3rd Cross		1	50.00	4.34	--	217.00		
	2nd Cross		1	50.00	5.05	--	252.50		
	1st Cross		1	50.00	3.25	--	162.50		
	4th Cross		1	50.00	2.94	--	147.00		
	Towards Ejipura		1	50.00	8.23	--	411.50		
	RHS								
	Towards Sarjapura (0.00 to 250.00)		1	250.00	29.34	--	7335.00		
	17th Main		1	50.00	7.02	--	351.00		
	2nd Cross		1	50.00	7.44	--	372.00		
	3rd Cross		1	50.00	7.43	--	371.50		
	4th Cross		1	50.00	7.46	--	373.00		
	5th Cross		1	50.00	7.80	--	390.00		
	6th Cross		1	50.00	8.06	--	403.00		
	Towards Koramangala 1st Block		1	50.00	10.97	--	548.50		
	7th Cross		1	50.00	6.98	--	349.00		
	8th main		1	50.00	11.73	--	586.50		
	4th Cross		1	50.00	6.53	--	326.50		
	Cross road		1	50.00	9.09	--	454.50		
	Towards Sarjapura		1	50.00	17.05	--	852.50		
	2nd main		1	50.00	4.42	--	221.00		
	2nd main (A)		1	50.00	6.89	--	344.50		

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು ಯೋಜನೆ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ.

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Cross Road		1	50.00	4.21	--	210.50		
	Cross Road		1	50.00	6.03	--	301.50		
	Cross Road		1	50.00	3.97	--	198.50		
	Cross Road		1	50.00	5.25	--	262.50		
	Towards Divya Jyothi Apartment		1	50.00	15.61	--	780.50		
							186253.78		
	Deduct Pier Excavation portion								
	Standard Span Pier	2	78	6.30	1.40	--	1375.92		
	Obligatory Span Pier	2	14	10.70	2.10	--	629.16		
	Obligatory Pier 25m Span	2	3	9.30	1.40	--	78.12		
							2083.20		
							184170.58		
						Say	184171.00	17.12	3152639.00
2.16	Providing and laying **bituminous concrete 40 mm thick** with 100 - 120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder at 5.4 to 5.6% of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H specification clause No. 500.9 complete in all respects as per specifications. MoRT&H Specification No. 509 with 30-45mm compacted thickness (grading II) with 6% 60/70 grade bitumen	Cum							
	(P.No.176 of I.No.21.22.4 in PW,P&IWTD S.R 2012-13)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.04	897.74		
	RHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.04	897.74		
	Up Ramp LHS & RHS		2	207.64	10.50	0.04	174.42		
	Down Ramp LHS & RHS		2	203.44	10.50	0.04	170.89		
	Obligatory Span								
	CH-1-442.29 to CH-1-482.291		1	40.00	25.00	0.04	40.00		
	CH-1-919.428 to CH-1-949.43		1	30.00	25.00	0.04	30.00		
	CH-1-1147.24 to CH-1-1177.24		1	30.00	25.00	0.04	30.00		
	CH-1-1284.74 to CH-1-1314.74		1	30.00	25.00	0.04	30.00		
	CH-1-1379.80 to CH-1-1409.80		1	30.00	25.00	0.04	30.00		
	CH-1-1735.07 to CH-1-1765.07		1	30.00	25.00	0.04	30.00		
	CH-1-1949.30 to CH-1-1977.45		1	28.15	25.00	0.04	28.15		
	CH-1-2386.85 to CH-1-2436.85		1	50.00	25.00	0.04	50.00		
	Standard Span Pier		78	27.20	2.25	0.04	190.94		
	Obligatory Span Pier		14	38.80	2.95	0.04	64.10		
	Obligatory Pier 25m Span		3	33.20	2.25	0.04	8.96		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	2.25	0.04	4.90		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	2.25	0.04	13.97		
	For Pedestrian Crossing								
	Kendriya Sadana Junction		4	34.00	1.50	0.04	8.16		
	Koramangala BDA Complex Junction		4	21.50	1.50	0.04	5.16		
	Koramangala 5th Block Junction		4	12.30	1.50	0.04	2.95		
	Koramangala 60 feet Road Junction		4	12.50	1.50	0.04	3.00		

ದಾಖಲೆಯನ್ನು ಮಾಡಿದ ಹಣ್ಣು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಆಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Koramangala 8th Main Junction		4	15.50	1.50	0.04	3.72		
	Sony world Junction		4	20.13	1.50	0.04	4.83		
	Ejipura Junction		4	18.30	1.50	0.04	4.39		
	Battery limit								
	Towards Kendriya sadana		1	100.00	28.97	0.04	115.88		
	Towards Domlur		1	100.00	26.86	0.04	107.42		
	Towards Hosur Road - Sarjapur Road		1	100.00	26.70	0.04	106.80		
	Towards Sarjapur Road -Madiwala Road		1	100.00	27.70	0.04	110.80		
	Cross Roads								
	LHS								
	17th Main		1	50.00	9.14	0.04	18.28		
	Towards St.Johns (0.00 to 250.00)		1	250.00	29.57	0.04	295.70		
	1st Cross		1	50.00	10.79	0.04	21.58		
	Road		1	50.00	11.57	0.04	23.14		
	7th Cross		1	50.00	7.60	0.04	15.20		
	4th Cross		1	50.00	9.22	0.04	18.44		
	Towards Sony World		1	50.00	17.90	0.04	35.80		
	Cross Road		1	50.00	5.40	0.04	10.80		
	Cross Road		1	50.00	6.07	0.04	12.14		
	7th Cross		1	50.00	3.49	0.04	6.98		
	Cross Road		1	50.00	2.33	0.04	4.66		
	4th Cross		1	50.00	4.34	0.04	8.68		
	3rd Cross		1	50.00	4.34	0.04	8.68		
	2nd Cross		1	50.00	5.05	0.04	10.10		
	1st Cross		1	50.00	3.25	0.04	6.50		
	4th Cross		1	50.00	2.94	0.04	5.88		
	Towards Ejipura		1	50.00	8.23	0.04	16.46		
	RHS								
	Towards Sarjapura (0.00 to 250.00)		1	250.00	29.34	0.04	293.40		
	17th Main		1	50.00	7.02	0.04	14.04		
	2nd Cross		1	50.00	7.44	0.04	14.88		
	3rd Cross		1	50.00	7.43	0.04	14.86		
	4th Cross		1	50.00	7.46	0.04	14.92		
	5th Cross		1	50.00	7.80	0.04	15.60		
	6th Cross		1	50.00	8.06	0.04	16.12		
	Towards Koramangala 1st Block		1	50.00	10.97	0.04	21.94		
	7th Cross		1	50.00	6.98	0.04	13.96		
	8th main		1	50.00	11.73	0.04	23.46		
	4th Cross		1	50.00	6.53	0.04	13.06		
	Cross road		1	50.00	9.09	0.04	18.18		
	Towards Sarjapura		1	50.00	17.05	0.04	34.10		
	2nd main		1	50.00	4.42	0.04	8.84		
	2nd main (A)		1	50.00	6.89	0.04	13.78		
	Cross Road		1	50.00	4.21	0.04	8.42		
	Cross Road		1	50.00	6.03	0.04	12.06		
	Cross Road		1	50.00	3.97	0.04	7.94		
	Cross Road		1	50.00	5.25	0.04	10.50		
	Towards Divya Jyothi Apartment		1	50.00	15.61	0.04	31.22		
							4285.23		
	Deduct Pier Excavation portion								
	Standard Span Pier	2	78	6.30	1.40	0.04	55.04		
	Obligatory Span Pier	2	14	10.70	2.10	0.04	25.17		
	Obligatory Pier 25m Span	2	3	9.30	1.40	0.04	3.12		
							83.33		
							4201.90		
						Say	4202.00	11177.44	46967596.00
2.17	Miscellaneous and Rounding off								120066226.00
									3774.00
								Total Cost of Surface Level Road / Slip Road	120070000.00

Assistant Executive Engineer
Traffic Engineering Cell
Bruhath Bangalore Mahanagara Palike
Bangalore - 560 002.

Executive Engineer
Traffic Engineering Cell (Road Infra)
Bruhat Bangalore Mahanagara Palike
Bangalore - 560 002.

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಪಕ್ಕ ಕಚೇರಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
2.13	KSRRB 200-7.Providing and applying tack coat on prepared black topped surfaces at **2.5 kg per 10 sqm**,heating bitumen in boiler fitted with spray set (Excluding cleaning of road surface) incuding cost of all materials, labour,HOM of machineries complete as per specifications. MORTH/Chapter 5	Sqm							
	(P.No. 173 I.No.21.7 of PW,P&IWTD S.R **2012-13**)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads (Over Exsting surface)								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	--	22443.51		
	RHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	--	22443.51		
	Up Ramp LHS & RHS		2	207.64	10.50	--	4360.44		
	Down Ramp LHS & RHS		2	203.44	10.50	--	4272.24		
	Obligatory Span								
	CH-1-442.29 to CH-1-482.291		1	40.00	25.00	--	1000.03		
	CH-1-919.428 to CH-1-949.43		1	30.00	25.00	--	750.05		
	CH-1-1147.24 to CH-1-1177.24		1	30.00	25.00	--	750.00		
	CH-1-1284.74 to CH-1-1314.74		1	30.00	25.00	--	750.00		
	CH-1-1379.80 to CH-1-1409.80		1	30.00	25.00	--	750.00		
	CH-1-1735.07 to CH-1-1765.07		1	30.00	25.00	--	750.00		
	CH-1-1949.30 to CH-1-1977.45		1	28.15	25.00	--	703.75		
	CH-1-2386.85 to CH-1-2436.85		1	50.00	25.00	--	1250.00		
	Standard Span Pier		78	27.20	2.25	--	4773.60		
	Obligatory Span Pier		14	38.80	2.95	--	1602.44		
	Obligatory Pier 25m Span		3	33.20	2.25	--	224.10		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	2.25	--	122.40		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	2.25	--	349.20		
							67295.26		
	Deduct Qty of Item No-1.07						17108.00		
							50187.26		
						Say	**50188.00**	17.12	**859118.00**
2.14	KSRRB M500-17. Providing and laying **dense graded bituminous macadam** with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder at 4.0 to 4.5% by weight of total mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignmnet, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H specification clause No. 500.7 complete in all respects as per specifications. Bitumen 60/70 MoRT&H Specification No. 507	Cum							
	(P.No. 175 I.No.21.19.2 of PW,P&IWTD S.R **2012-13**)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.05	1122.18		
	RHS								

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.05	1122.18		
	Up Ramp LHS & RHS		2	207.64	10.50	0.05	218.02		
	Down Ramp LHS & RHS		2	203.44	10.50	0.05	213.61		
	Obligatory Span								
	CH-1-442.29 to CH-1-482.291		1	40.00	25.00	0.05	50.00		
	CH-1-919.428 to CH-1-949.43		1	30.00	25.00	0.05	37.50		
	CH-1-1147.24 to CH-1-1177.24		1	30.00	25.00	0.05	37.50		
	CH-1-1284.74 to CH-1-1314.74		1	30.00	25.00	0.05	37.50		
	CH-1-1379.80 to CH-1-1409.80		1	30.00	25.00	0.05	37.50		
	CH-1-1735.07 to CH-1-1765.07		1	30.00	25.00	0.05	37.50		
	CH-1-1949.30 to CH-1-1977.45		1	28.15	25.00	0.05	35.19		
	CH-1-2386.85 to CH-1-2436.85		1	50.00	25.00	0.05	62.50		
	Standard Span Pier		78	27.20	2.25	0.05	238.68		
	Obligatory Span Pier		14	38.80	2.95	0.05	80.12		
	Obligatory Pier 25m Span		3	33.20	2.25	0.05	11.21		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	2.25	0.05	6.12		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	2.25	0.05	17.46		
	Battery limit								
	Towards Kendriya sadana		1	100.00	28.97	0.05	144.85		
	Towards Domlur		1	100.00	26.86	0.05	134.28		
	Towards Hosur Road - Sarjapur Road		1	100.00	26.70	0.05	133.50		
	Towards Sarjapur Road -Madiwala road		1	100.00	27.70	0.05	138.50		
	For Pedestrian Crossing								
	Kendriya Sadana Junction		4	34.00	1.50	0.05	10.20		
	Koramangala BDA Complex Junction		4	21.50	1.50	0.05	6.45		
	Koramangala 5th Block Junction		4	12.30	1.50	0.05	3.69		
	Koramangala 60 feet Road Junction		4	12.50	1.50	0.05	3.75		
	Koramangala 8th Main Junction		4	15.50	1.50	0.05	4.65		
	Sony world Junction		4	20.13	1.50	0.05	6.04		
	Ejipura Junction		4	18.30	1.50	0.05	5.49		
							3956.16		
	Deduct Pier Excavation portion								
	Standard Span Pier	2	78	6.30	1.40	0.05	68.80		
	Obligatory Span Pier	2	14	10.70	2.10	0.05	31.46		
	Obligatory Pier 25m Span	2	3	9.30	1.40	0.05	3.91		
							104.16		
							3852.00		
						Say	**3852.00**	9183.46	**35374673.00**
2.15	KSRRB 200-7.Providing and applying tack coat on prepared black topped surfaces at **2.5 kg per 10 sqm**,heating bitumen in boiler fitted with spray set (Excluding cleaning of road surface) incuding cost of all materials, labour,HOM of machineries complete as per specifications. MORTH/Chapter 5	**Sqm**							
	(P.No. 173 I.No.21.7 of PW,P&IWTD S.R 2012-13)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads (Over BM & DBM)								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)	2	1	2137.48	10.50	--	44887.02		
	RHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)	2	1	2137.48	10.50	--	44887.02		
	Up Ramp LHS & RHS	2	2	207.64	10.50	--	8720.88		
	Down Ramp LHS & RHS	2	2	203.44	10.50	--	8544.48		
	Obligatory Span								

ದಾಖಲೆಯನ್ನು ಪೂರೈತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	CH-1-442.29 to CH-1-482.291	2	1	40.00	25.00	--	2000.05		
	CH-1-919.428 to CH-1-949.43	2	1	30.00	25.00	--	1500.10		
	CH-1-1147.24 to CH-1-1177.24	2	1	30.00	25.00	--	1500.00		
	CH-1-1284.74 to CH-1-1314.74	2	1	30.00	25.00	--	1500.00		
	CH-1-1379.80 to CH-1-1409.80	2	1	30.00	25.00	--	1500.00		
	CH-1-1735.07 to CH-1-1765.07	2	1	30.00	25.00	--	1500.00		
	CH-1-1949.30 to CH-1-1977.45	2	1	28.15	25.00	--	1407.50		
	CH-1-2386.85 to CH-1-2436.85	2	1	50.00	25.00	--	2500.00		
	Standard Span Pier	2	78	27.20	2.25	--	9547.20		
	Obligatory Span Pier	2	14	38.80	2.95	--	3204.88		
	Obligatory Pier 25m Span	2	3	33.20	2.25	--	448.20		
	Up Ramp and Down Ramp								
	Standard Span Pier	2	2	27.20	2.25	--	244.80		
	Up Ramp and Down Ramp								
	Obligatory Pier	2	4	38.80	2.25	--	698.40		
	For Pedestrian Crossing								
	Kendriya Sadana Junction	2	4	34.00	1.50	--	408.00		
	Koramangala BDA Complex Junction	2	4	21.50	1.50	--	258.00		
	Koramangala 5th Block Junction	2	4	12.30	1.50	--	147.60		
	Koramangala 60 feet Road Junction	2	4	12.50	1.50	--	150.00		
	Koramangala 8th Main Junction	2	4	15.50	1.50	--	186.00		
	Sony world Junction	2	4	20.13	1.50	--	241.56		
	Ejipura Junction	2	4	18.30	1.50	--	219.60		
	Battery limit								
	Towards Kendriya sadana	2	1	100.00	28.97	--	5794.00		
	Towards Domlur	2	1	100.00	26.86	--	5371.00		
	Towards Hosur Road - Sarjapur Road Juction	2	1	100.00	26.70	--	5340.00		
	Towards Sarjapur Road -Madiwala Road Juction	2	1	100.00	27.70	--	5540.00		
	Cross Roads								
	LHS								
	17th Main		1	50.00	9.14	--	457.00		
	Towards St.Johns (0.00 to 250.00)		1	250.00	29.57	--	7392.50		
	1st Cross		1	50.00	10.79	--	539.50		
	Road		1	50.00	11.57	--	578.50		
	7th Cross		1	50.00	7.60	--	380.00		
	4th Cross		1	50.00	9.22	--	461.00		
	Towards Sony World		1	50.00	17.90	--	895.00		
	Cross Road		1	50.00	5.40	--	270.00		
	Cross Road		1	50.00	6.07	--	303.50		
	7th Cross		1	50.00	3.49	--	174.50		
	Cross Road		1	50.00	2.33	--	116.50		
	4th Cross		1	50.00	4.34	--	217.00		
	3rd Cross		1	50.00	4.34	--	217.00		
	2nd Cross		1	50.00	5.05	--	252.50		
	1st Cross		1	50.00	3.25	--	162.50		
	4th Cross		1	50.00	2.94	--	147.00		
	Towards Ejipura		1	50.00	8.23	--	411.50		
	RHS						--		
	Towards Sarjapura (0.00 to 250.00)		1	250.00	29.34	--	7335.00		
	17th Main		1	50.00	7.02	--	351.00		
	2nd Cross		1	50.00	7.44	--	372.00		
	3rd Cross		1	50.00	7.43	--	371.50		
	4th Cross		1	50.00	7.46	--	373.00		
	5th Cross		1	50.00	7.80	--	390.00		
	6th Cross		1	50.00	8.06	--	403.00		
	Towards Koramangala 1st Block		1	50.00	10.97	--	548.50		
	7th Cross		1	50.00	6.98	--	349.00		
	8th main		1	50.00	11.73	--	586.50		
	4th Cross		1	50.00	6.53	--	326.50		
	Cross road		1	50.00	9.09	--	454.50		
	Towards Sarjapura		1	50.00	17.05	--	852.50		
	2nd main		1	50.00	4.42	--	221.00		
	2nd main (A)		1	50.00	6.89	--	344.50		

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Cross Road		1	50.00	4.21	--	210.50		
	Cross Road		1	50.00	6.03	--	301.50		
	Cross Road		1	50.00	3.97	--	198.50		
	Cross Road		1	50.00	5.25	--	262.50		
	Towards Divya Jyothi Apartment		1	50.00	15.61	--	780.50		
							186253.78		
	Deduct Pier Excavation portion								
	Standard Span Pier	2	78	6.30	1.40	--	1375.92		
	Obligatory Span Pier	2	14	10.70	2.10	--	629.16		
	Obligatory Pier 25m Span	2	3	9.30	1.40	--	78.12		
							2083.20		
							184170.58		
						Say	184171.00	17.12	3152639.00
2.16	Providing and laying **bituminous concrete 40 mm thick** with 100 - 120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder at 5.4 to 5.6% of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H specification clause No. 500.9 complete in all respects as per specifications. MoRT&H Specification No. 509 with 30-45mm compacted thickness (grading II) with 6% 60/70 grade bitumen	Cum							
	(P.No.176 of I.No.21.22.4 in PW,P&IWTD S.R 2012-13)								
	(Prevailing Rate as on 26-12-2012)								
	Surface level Roads								
	LHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.04	897.74		
	RHS								
	CH-1-199.83 to CH-1-2605.46 (deductions of Obligatory Span)		1	2137.48	10.50	0.04	897.74		
	Up Ramp LHS & RHS		2	207.64	10.50	0.04	174.42		
	Down Ramp LHS & RHS		2	203.44	10.50	0.04	170.89		
	Obligatory Span								
	CH-1-442.29 to CH-1-482.291		1	40.00	25.00	0.04	40.00		
	CH-1-919.428 to CH-1-949.43		1	30.00	25.00	0.04	30.00		
	CH-1-1147.24 to CH-1-1177.24		1	30.00	25.00	0.04	30.00		
	CH-1-1284.74 to CH-1-1314.74		1	30.00	25.00	0.04	30.00		
	CH-1-1379.80 to CH-1-1409.80		1	30.00	25.00	0.04	30.00		
	CH-1-1735.07 to CH-1-1765.07		1	30.00	25.00	0.04	30.00		
	CH-1-1949.30 to CH-1-1977.45		1	28.15	25.00	0.04	28.15		
	CH-1-2386.85 to CH-1-2436.85		1	50.00	25.00	0.04	50.00		
	Standard Span Pier		78	27.20	2.25	0.04	190.94		
	Obligatory Span Pier		14	38.80	2.95	0.04	64.10		
	Obligatory Pier 25m Span		3	33.20	2.25	0.04	8.96		
	Up Ramp and Down Ramp								
	Standard Span Pier		2	27.20	2.25	0.04	4.90		
	Up Ramp and Down Ramp								
	Obligatory Pier		4	38.80	2.25	0.04	13.97		
	For Pedestrian Crossing								
	Kendriya Sadana Junction		4	34.00	1.50	0.04	8.16		
	Koramangala BDA Complex Junction		4	21.50	1.50	0.04	5.16		
	Koramangala 5th Block Junction		4	12.30	1.50	0.04	2.95		
	Koramangala 60 feet Road Junction		4	12.50	1.50	0.04	3.00		

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Koramangala 8th Main Junction		4	15.50	1.50	0.04	3.72		
	Sony world Junction		4	20.13	1.50	0.04	4.83		
	Ejipura Junction		4	18.30	1.50	0.04	4.39		
	Battery limit								
	Towards Kendriya sadana		1	100.00	28.97	0.04	115.88		
	Towards Domlur		1	100.00	26.86	0:04	107.42		
	Towards Hosur Road - Sarjapur Road		1	100.00	26.70	0.04	106.80		
	Towards Sarjapur Road -Madiwala Road		1	100.00	27.70	0.04	110.80		
	Cross Roads								
	LHS								
	17th Main		1	50.00	9.14	0.04	18.28		
	Towards St.Johns (0.00 to 250.00)		1	250.00	29.57	0.04	295.70		
	1st Cross		1	50.00	10.79	0.04	21.58		
	Road		1	50.00	11.57	0.04	23.14		
	7th Cross		1	50.00	7.60	0.04	15.20		
	4th Cross		1	50.00	9.22	0.04	18.44		
	Towards Sony World		1	50.00	17.90	0.04	35.80		
	Cross Road		1	50.00	5.40	0.04	10.80		
	Cross Road		1	50.00	6.07	0.04	12.14		
	7th Cross		1	50.00	3.49	0.04	6.98		
	Cross Road		1	50.00	2.33	0.04	4.66		
	4th Cross		1	50.00	4.34	0.04	8.68		
	3rd Cross		1	50.00	4.34	0.04	8.68		
	2nd Cross		1	50.00	5.05	0.04	10.10		
	1st Cross		1	50.00	3.25	0.04	6.50		
	4th Cross		1	50.00	2.94	0.04	5.88		
	Towards Ejipura		1	50.00	8.23	0.04	16.46		
	RHS								
	Towards Sarjapura (0.00 to 250.00)		1	250.00	29.34	0.04	293.40		
	17th Main		1	50.00	7.02	0.04	14.04		
	2nd Cross		1	50.00	7.44	0.04	14.88		
	3rd Cross		1	50.00	7.43	0.04	14.86		
	4th Cross		1	50.00	7.46	0.04	14.92		
	5th Cross		1	50.00	7.80	0.04	15.60		
	6th Cross		1	50.00	8.06	0.04	16.12		
	Towards Koramangala 1st Block		1	50.00	10.97	0.04	21.94		
	7th Cross		1	50.00	6.98	0.04	13.96		
	8th main		1	50.00	11.73	0.04	23.46		
	4th Cross		1	50.00	6.53	0.04	13.06		
	Cross road		1	50.00	9.09	0.04	18.18		
	Towards Sarjapura		1	50.00	17.05	0.04	34.10		
	2nd main		1	50.00	4.42	0.04	8.84		
	2nd main (A)		1	50.00	6.89	0.04	13.78		
	Cross Road		1	50.00	4.21	0.04	8.42		
	Cross Road		1	50.00	6.03	0.04	12.06		
	Cross Road		1	50.00	3.97	0.04	7.94		
	Cross Road		1	50.00	5.25	0.04	10.50		
	Towards Divya Jyothi Apartment		1	50.00	15.61	0.04	31.22		
							4285.23		
	Deduct Pier Excavation portion								
	Standard Span Pier	2	78	6.30	1.40	0.04	55.04		
	Obligatory Span Pier	2	14	10.70	2.10	0.04	25.17		
	Obligatory Pier 25m Span	2	3	9.30	1.40	0.04	3.12		
							83.33		
							4201.90		
						Say	4202.00	1177.44	46967596.00
2.17	Miscellaneous and Rounding off								120066226.00
									3774.00
									120070000.00

Assistant Executive Engineer
Traffic Engineering Cell
Bruhath Bangalore Mahanagara Palike
Bangalore - 560 002.

Executive Engineer
Traffic Engineering Cell (Road Infra)
Bruhat Bangalore Mahanagara Palike
Bangalore - 560 002.

Total Cost of Surface Level Road / Slip Road

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BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Detailed Cost Estimate

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
3.00	**DRAIN WORKS**								
	a) For Road side Drain								
3.01	**Excavation** for road way in soil by **mechanical means** including cutting and pushing the earth to site of embankment upto a distance of 100 metres (average lead 50 metres), including trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections complete as per specifications. MoRT&H Specification No. 301	Cum							
	(P.No.151, I.No.19.11 of PW,P&IWTD S.R 2012-13)								
	For Utility Duct(LHS)								
	Ch:100.00 to 450.00		1	350.00	1.31	1.83	839.06		
	Ch:1974.50 to 2012.75		1	38.25	1.31	1.83	91.70		
	Ch:2280.00 to 2670.00		1	390.00	1.31	1.83	934.95		
	Ch:2400.00 to 2610.00		1	210.00	1.31	1.83	503.43		
	RHS								
	Ch:0.00.00 to 450.00		1	450.00	1.31	1.83	1078.79		
	Ch:1980.00 to 2130.00		1	150.00	1.31	1.83	359.60		
	Ch:2280.00 to 2610.00		1	330.00	1.31	1.83	791.11		
	For Drain (LHS)								
	Ch:0.00.00 to 450.00		1	450.00	1.56	1.28	898.56		
	Ch:480.00 to 1140.00		1	660.00	1.56	1.28	1317.89		
	Ch:1770.00.00 to 2390.00		1	620.00	1.56	1.28	1238.02		
	Ch:2410.00.00 to 2610.00		1	200.00	1.56	1.28	399.36		
	For Drain (RHS)								
	Ch:0.00.00 to 450.00		1	450.00	1.56	1.28	898.56		
	Ch:480.00 to 1140.00		1	660.00	1.56	1.28	1317.89		
	Ch:1770.00.00 to 2390.00		1	620.00	1.56	1.28	1238.02		
	Ch:2410.00.00 to 2610.00		1	200.00	1.56	1.28	399.36		
							12306.27		
	Deduct for SWD								
	Ch:1958.00 to1974.50 (LHS)		1	16.50	1.56	1.28	32.95		
	Ch:1958.00 to1974.50 (RHS)		1	16.50	1.56	1.28	32.95		
							65.89		
						Net Qty	12240.37		
						Say	**12241.00**	70.20	**859318.00**
3.02	KSRRB M2100 - 13. **Plain Cement Concrete M15** with OPC cement @ 240kgs, with 40mm and down size graded granite metal coarse aggregates @ 0.84cum and fine aggregates @ 0.56cum in Open Foundation complete as per Drawing and Technical Specifications MoRT&H Specification No. 1500, 1700 & 2100	Cum							
	(P.No.223, I.No.27.24 of PW,P&IWTD S.R 2012-13)								
	For Utility Duct(LHS)								
	Ch:100.00 to 450.00		1	350.00	1.31	0.10	45.85		
	Ch:1974.50 to 2012.75		1	38.25	1.31	0.10	5.01		
	Ch:2280.00 to 2670.00		1	390.00	1.31	0.10	51.09		
	Ch:2400.00 to 2610.00		1	210.00	1.31	0.10	27.51		
	RHS								
	Ch:0.00.00 to 450.00		1	450.00	1.31	0.10	58.95		

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Ch:1980.00 to 2130.00		1	150.00	1.31	0.10	19.65		
	Ch:2280.00 to 2610.00		1	330.00	1.31	0.10	43.23		
	For Drain (LHS)								
	Ch:0.00.00 to 450.00		1	450.00	1.56	0.10	70.20		
	Ch:480.00 to 1140.00		1	660.00	1.56	0.10	102.96		
	Ch:1770.00.00 to 2390.00		1	620.00	1.56	0.10	96.72		
	Ch:2410.00.00 to 2610.00		1	200.00	1.56	0.10	31.20		
	For Drain (RHS)								
	Ch:0.00.00 to 450.00		1	450.00	1.56	0.10	70.20		
	Ch:480.00 to 1140.00		1	660.00	1.56	0.10	102.96		
	Ch:1770.00.00 to 2390.00		1	620.00	1.56	0.10	96.72		
	Ch:2410.00.00 to 2610.00		1	200.00	1.56	0.10	31.20		
							853.45		
	Deduct for SWD								
	Ch:1958.00 to1974.50 (LHS)		1	16.50	1.56	0.10	2.57		
	Ch:1958.00 to1974.50 (RHS)		1	16.50	1.56	0.10	2.57		
							5.15		
							848.30		
						Say	**849.00**	3892.32	**3304580.00**
3.03	KSRRB 2200-5.9 Design mix **M20 in sub structure** with OPC cement @ 320kgs, with 20mm and down graded granite metal coarse aggregates @0.69cum and fine aggregates @ 0.46cum, with superplastisiser @ 3lts conforming to IS9103-1999 Reaffirmed-2008 - i) **Upto 5 m height**	Cum							
	(P.No.228, I.No.28.7.9 of PW, P& IWTD SR 2012-13)								
	For Drain Bottom slab								
	For Utility Duct(LHS)								
	Ch:100.00 to 450.00		1	350.00	1.11	0.18	69.93		
	Ch:1974.50 to 2012.75		1	38.25	1.11	0.18	7.64		
	Ch:2280.00 to 2670.00		1	390.00	1.11	0.18	77.92		
	Ch:2400.00 to 2610.00		1	210.00	1.11	0.18	41.96		
	RHS								
	Ch:0.00.00 to 450.00		1	450.00	1.11	0.18	89.91		
	Ch:1980.00 to 2130.00		1	150.00	1.11	0.18	29.97		
	Ch:2280.00 to 2610.00		1	330.00	1.11	0.18	65.93		
	For Drain (LHS)								
	Ch:0.00.00 to 450.00		1	450.00	1.36	0.10	61.20		
	Ch:480.00 to 1140.00		1	660.00	1.36	0.10	89.76		
	Ch:1770.00.00 to 2390.00		1	620.00	1.36	0.10	84.32		
	Ch:2410.00.00 to 2610.00		1	200.00	1.36	0.10	27.20		
	For Drain (RHS)								
	Ch:0.00.00 to 450.00		1	450.00	1.36	0.10	61.20		
	Ch:480.00 to 1140.00		1	660.00	1.36	0.10	89.76		
	Ch:1770.00.00 to 2390.00		1	620.00	1.36	0.10	84.32		
	Ch:2410.00.00 to 2610.00		1	200.00	1.36	0.10	27.20		
							908.23		
	Deduct for SWD								
	Ch:1958.00 to1974.50 (LHS)		1	16.50	1.36	0.10	2.24		
	Ch:1958.00 to1974.50 (RHS)		1	16.50	1.36	0.10	2.24		
							4.49		
							903.74		
	For Drain Side Wall								
	For Utility Duct(LHS)								
	Ch:100.00 to 450.00		2	350.00	0.18	1.50	189.00		
	Ch:1974.50 to 2012.75		2	38.25	0.18	1.50	20.66		
	Ch:2280.00 to 2670.00		2	390.00	0.18	1.50	210.60		
	Ch:2400.00 to 2610.00		2	210.00	0.18	1.50	113.40		
	RHS								
	Ch:0.00.00 to 450.00		2	450.00	0.18	1.50	243.00		
	Ch:1980.00 to 2130.00		2	150.00	0.18	1.50	81.00		

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Ch:2280.00 to 2610.00		2	330.00	0.18	1.50	178.20		
	For Drain (LHS)								
	Ch:0.00.00 to 450.00		2	450.00	0.18	1.00	162.00		
	Ch:480.00 to 1140.00		2	660.00	0.18	1.00	237.60		
	Ch:1770.00.00 to 2390.00		2	620.00	0.18	1.00	223.20		
	Ch:2410.00.00 to 2610.00		2	200.00	0.18	1.00	72.00		
	For Drain (RHS)								
	Ch:0.00.00 to 450.00		2	450.00	0.18	1.00	162.00		
	Ch:480.00 to 1140.00		2	660.00	0.18	1.00	237.60		
	Ch:1770.00.00 to 2390.00		2	620.00	0.18	1.00	223.20		
	Ch:2410.00.00 to 2610.00		2	200.00	0.18	1.00	72.00		
							2425.46		
	Deduct for SWD								
	Ch:1958.00 to1974.50 (LHS)		2	16.50	0.18	1.00	5.94		
	Ch:1958.00 to1974.50 (RHS)		2	16.50	0.18	1.00	5.94		
							11.88		
							2413.58		
							3317.31		
						Say	3318.00	5176.44	17175428.00
3.04	KSRRB M2300 - 14. Supplying, fitting and placing **TMT bar reinforcement in sub - structure** complete as per drawing and technical specifications complete as per specifications. MoRT&H Specification No. 1600 & 2200	MT							
	(P.No.230, I.No.28.8 of PW, P&IWTD SR 2012-13)								
	Steel at 70kg/cum		--	--	--	--	232.26		
						Say	233.00	68178.24	15885530.00
3.05	Providing and fixing RCC Precast Cover slab of 100mm thick for drain in cement concrete 1:1.5:3 using graded granite jelly 20mm and down size with steel reinforcement, including form work, lift charges, curing and concrete finished surfaces on both sides etc, complete and as per the directions of Engineer in-Charge.	Sqm							
	(Data Rate)								
	Utility Duct and Drain Cover Slab								
	For Utility Duct(LHS)								
	Ch:100.00 to 450.00		1	350.00	1.11	--	388.50		
	Ch:1974.50 to 2012.75		1	38.25	1.11	--	42.46		
	Ch:2280.00 to 2670.00		1	390.00	1.11	--	432.90		
	Ch:2400.00 to 2610.00		1	210.00	1.11	--	233.10		
	RHS								
	Ch:0.00.00 to 450.00		1	450.00	1.11	--	499.50		
	Ch:1980.00 to 2130.00		1	150.00	1.11	--	166.50		
	Ch:2280.00 to 2610.00		1	330.00	1.11	--	366.30		
	For Drain (LHS)								
	Ch:0.00.00 to 450.00		1	450.00	1.36	--	612.00		
	Ch:480.00 to 1140.00		1	660.00	1.36	--	897.60		
	Ch:1770.00.00 to 2390.00		1	620.00	1.36	--	843.20		
	Ch:2410.00.00 to 2610.00		1	200.00	1.36	--	272.00		
	For Drain (RHS)								
	Ch:0.00.00 to 450.00		1	450.00	1.36	--	612.00		
	Ch:480.00 to 1140.00		1	660.00	1.36	--	897.60		
	Ch:1770.00.00 to 2390.00		1	620.00	1.36	--	843.20		
	Ch:2410.00.00 to 2610.00		1	200.00	1.36	--	272.00		
							7378.86		
	Deduct for SWD								
	Ch:1958.00 to1974.50 (LHS)		1	16.50	1.36	--	22.44		
	Ch:1958.00 to1974.50 (RHS)		1	16.50	1.36	--	22.44		
							44.88		

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
							7333.98		
						Say	7334.00	1489.00	10920326.00
3.06	KSSRB M220 - 8. Providing weep holes in Brick masonry / Plain / Reinforced concrete abutment, wing wall / return wall with 100mm dia AC pipe, extending through the full width of the structure with slope of 1V:20H towards drawing foce. Complete as per drawing and Technical Specifications complete as per specifications. MoRT&H Specification No. 2706 & 2200	Nos./ Mtr							
	P.No 230 INo 28.10 of PW,P&IWTD S.R 2012-13)								
	LHS		1	1930	0.30	--	579.00		
	RHS		1	1930	0.30	--	579.00		
							1158.00		
						Say	1158.00	148.23	171650.00
3.07	KSRB 2.3: Filling available Excavated Earth (excluding rock) in sides of foundations upto plinth in layers not exceeding 20cms in depth, compacting each deposited layer by raming after watering with lead upto 50m and lift upto 1.5 m including cost of all labour complete as per specifications. Specification No.KBS 2.9	Cum							
	(P.No.6, I.No.2.10 of PW, P&IWTD S.R 2012-13)								
	LHS		1	1930.00	0.10	1.20	231.60		
	RHS		1	1930.00	0.10	1.20	231.60		
							463.20		
						Say	464.00	90.72	42094.00
3.08	KSRRB M100-4.2. Haulage of materials by tipper including cost of loading, unloading and stacking complete as per specifications. MoRT&H Chapter 1 Case-I : Surface Road	Cum							
	(P. No.147 of PW, P&IWTD S.R 2012-13)								
	Qnty same as item no 2.01- 2.07								
	For 20Km RS. 2.00 X 1.28X 20 = (52.00 + 62.20)X1.08=122.47		1	11777.00			11777.00	122.47	1442353.00
									49801279.00
	Miscellaneous and Rounding off								8721.00
								Total Cost of Road Side Drain	49810000.00
	b) Culverts Across the Roads								
3.09	KSRRB M2100-2.1. Earthwork in excavation for foundation of structures as per drawing and technical specifications, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material complete as per specifications. B. Mechanical Means (i) Depth upto 3m. (Add 10% Extra for Dewatering)	Cum							
	(P.No.221, I.No.27.4 of PW,P&IWTD S.R 2012-13)								
	Kendriya Sadana Junction								
	LHS								
	31.70m Length		1	31.70	2.80	2.15	190.83		
	RHS								
	32.56m Length		1	32.56	2.80	2.15	196.01		
	Sony world junction								

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
3.13	KSSRB M220 - 8. Providing **weep holes in** Brick masonry / Plain / Reinforced concrete abutment, wing wall / return wall with 100mm dia AC pipe, extending through the full width of the structure with slope of 1V:20H towards drawing foce. Complete as per drawing and Technical Specifications complete as per specifications. MoRT&H Specification No. 2706 & 2200	Nos./ Mtr							
	P.No 230 I.No 28.10 of PW,P&IWTD S.R 2012-13)								
	Kendriya Sadana Junction								
	LHS			31.87	0.30	--	9.56		
	RHS			32.56	0.30	--	9.77		
	Sony world junction								
	LHS			24.61	0.30	--	7.38		
	RHS			22.74	0.30	--	6.82		
	Ejipura Junction								
	LHS			15.00	0.30	--	4.50		
	RHS			21.00	0.30	--	6.30		
							44.33		
						Say	**44.50**	148.23	**6596.00**
3.14	KSRB 2.6: **Providing and filling sand in** foundation upto plinth to required depth for sub soil treatment including watering ramming with all lead and lift complete as per Specifications. Specification. No. KBS 2.10.2	Cum							
	P.No 6 INo 2.13 of PW,P&IWTD S.R 2012-13)								
	Kendriya Sadana Junction								
	LHS	2	1	31.87	0.30	1.50	28.68		
	RHS	2	1	32.56	0.30	1.00	19.54		
	Sony world junction	2	1						
	LHS	2	1	24.61	0.30	1.00	14.77		
	RHS	2	1	22.74	0.30	1.50	20.47		
	Ejipura Junction	2	1						
	LHS	2	1	15.00	0.30	1.50	13.50		
	RHS	2	1	21.00	0.30	1.00	12.60		
							109.55		
						Say	**110.00**	1298.16	**142798.00**
3.15	KSRRB M100-4.2. **Haulage** of materials by tipper Including cost of loading, unloading and stacking complete as per specifications. MoRT&H Chapter 1 Case-I : Surface Road	Cum							
	(P. No.147 of PW, P&IWTD S.R 2012-13)								
	Qnty same as item No. 2.09								
	For 20Km Rs. 2.00 X 1.28 X 20 = (52.00 +		1	819.00	--	--	**819.00**	122.47	**100305.00**
									5223524.00
	Miscellaneous and Rounding off								476.00
								Total Cost of Culvert	**5224000.00**

Assistant Executive Engineer
Traffic Engineering Cell,
Bruhath Bangalore Mahanagara Palike
Bangalore - 560 002.

Executive Engineer
Traffic Engineering Cell (Road Infra)
Bruhat Bangalore Mahanagara Palike
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Manasa consultants ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	c) RCC Box Culvert for Storm Water Drain & Retaining Wall								
3.16	KSRB 2100 - 5: **Excavation in Marshy soil up to 3m depth** for foundations of structures as per drawing and technical specifications including removing the excavated stuff to a lead of 15m, including dewatering, shoring and shuttering, refilling trenches in 250mm layers, wherever necessary watering and ramming including cost of all materials, labour complete as per specifications. MoRT&H Chapter 12	Cum							
	(P.No.222, I.No.27.11 of PW,P&IWTD S.R 2012-13)								
	For Removing Silt								
	Existing Storm Water DrainPortion								
	CH:1958.00 to1974.50		1	45.00	16.50	1.00	742.50		
						Say	742.50	386.64	**287080.00**
3.17	**Diversion of water course** by providing Coffer dams or bunds or islands as may be necessary for piers and abutments foundations, bailing out or pumping water during excavation and until completion etc., complete. Beyond 1.50m depth upto & including 3m depth.	Cum							
	(P.No.269, I.No.37.41.2 of PW,P&IWTD S.R 2012-13)								
	Existing Storm Water DrainPortion								
	CH:1958.00 to1974.50		1	45.00	6.00	2.00	540.00		
						Say	540.00	274.32	**148133.00**
3.18	KSRB - 5.1.1: **Providing and constructing grantie / trap / basalt rubble stone masornry** in foundation with mud mortar (uncoursed), bond stones at two m apart in each course including cost of materials, labour, curing complete as per specifications. KBS 5.1.12	Cum							
	(P.No.25, I.No.5.1 of PW,P&IWTD S.R 2012-13)								
	For Diversion of Water								
	CH:1958.00 to1974.50		2	45.00	1.00	1.50	135.00		
						Say	135.00	1156.68	**156152.00**
3.19	**KSRRB M2100-2.1. Earth work** in excavation for foudnation of structures as per drawing and techncial specifications, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material complete as per specifications. B. Mechanical Means **(i) Depth upto 3m.** (Add 10% Extra for Dewatering)								
	(P.No.221, I.No.27.4 of PW,P&IWTD S.R 2012-13)								
	CH:1958.00 to1974.50								
	Retaining Wall		4	10.00	4.80	3.00	576.00		
	Apprach Slab		2	25.00	3.00	0.45	67.50		
							643.50		
						Say	643.50	44.37	**28553.00**

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
3.20	KSRRB M2100-2.1. **Earthwork** in excavation for foundation of structures as per drawing and technical specifications, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material complete as per specifications, B.Mechanical means **ii) Depth 3m to 6m**								
	Add 10% extra for dewatering charges								
	(P.No.221, I.No.27.5 of PW,P&IWTD S.R 2012-13)								
	CH:1958.00 to1974.50								
	Box Portion		1	35.00	21.80	7.25	5531.75		
	Retaining Wall		4	10.00	4.80	3.90	748.80		
	Deduct Existing Storm Water Drain		-1	35.00	17.00	4.00	-2380.00		
							3900.55		
						Say	3901.00	50.73	197888.00
3.21	KSRRB M100-4.2. **Haulage** of materials by tipper including cost of loading, unloading and stacking complete as per specifications. MoRT&H Chapter 1 Case-I : Surface Road	Cum							
	(P. No.147 of PW, P&IWTD S.R 2012-13)								
	Qnty same as item no 2.16, 2.17, 2.18, 2.19								
	For 20Km Rs. 2.00 X 1.28 X 20 = (52.00 + 62.20)X1.08=122.47						5962.00		
						Say	5962.00	122.47	730178.00
3.22	**Providing and filling in foundation with granite / trap broken metal 100mm.** and down size, with approved sand including hand packing, ramming, watering, including cost of all materials and labour with all lead and lift complete as per specifications.	Cum							
	P.No 6 I.No 2.15 of PW,P&IWTD SR 2012-13)								
	CH:1958.00 to1974.50								
	Box Portion		1	35.00	21.30	0.30	223.65		
	Retaining Wall		4	10.00	4.30	0.30	51.60		
	Approch Slab		2	25.00	3.00	0.30	45.00		
							320.25		
						Say	320.50	1135.08	363793.00
3.23	KSRRB M 2200 5 - 12: **Plain Cement Concrete M15** with OPC cement @ 240 kgs, with 40mm and down size graded granite metal coarse aggregates @ 0.63cum and fine aggregates @0.42cum - **i) Upto 5m height.**	Cum							
	P.No 227 I.No 28.7.1 of PW,P&IWTD SR 2012-13)								
	CH:1958.00 to1974.50								
	Approch Slab		2	25.00	3.00	0.15	22.50		
	Box Portion		1	35.00	21.30	0.15	111.83		
	Retaining Wall		4	10.00	4.30	0.15	25.80		
							160.13		
						Say	160.50	4115.88	660599.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
3.24	KSRRB 2200-5.18 **Design mix M35** with OPC cement @ 390kgs, with 20mm and down size graded granite metal coarse aggregates @ 0.68cum and fine aggregates @ 0.45cum, with superplastisiser @ 3lts confirming to IS9103-1999 Reaffirmed-2008 - **i) Upto 5m height.**	Cum							
	(P.No.229, I.No.28.7.18 of PW,P&IWTD S.R 2012-13)								
	CH:1958.00 to1974.50								
	Box Portion								
	Bottom Slab		1	35.00	21.00	0.65	477.75		
	Side Walls		3	35.00	0.60	5.50	346.50		
	Carbel		2	35.00	0.55	0.30	11.55		
	Haunches	0.5	8	35.00	0.30	0.30	12.60		
	Retaining Wall						848.40		
	Bottom Slab		4	10.00	4.10	0.30	49.20		
			4	10.00	2.43	0.45	43.65		
	Stem		4	10.00	0.48	6.15	116.85		
	Approch Slab		2	25.00	3.00	0.20	30.00		
							239.70		
							1088.10		
						Say	1088.50	5795.28	6308162.00
3.25	KSRRB M2300 - 14. Supplying, fitting and placing **TMT bar reinforcement in sub - structure** complete as per drawing and technical specifications complete as per specifications. MoRT&H Specification No. 1600 & 2200	MT							
	(P.No.230, I.No.28.8 of PW, P&IWTD SR 2012-13)								
	Qty same as item no 2.24								
	Considering 130kg/cum for Culvert			848.40	--	--	110.29		
	Considering 80kg/cum for Retaining wall			239.70	--	--	19.18		
							129.47		
						Say	129.50	68178.24	8829082.00
3.26	KSRB M 2300 - 7.2: Furnishing and Placing Reinforced / Prestressed Cement Concrete in **Super-structure** as per drawing and technical specification complete as per specifications. D.RCC / PSC with OPC Cement **Design mix M35** @ 390 kgs, with 20mm and down size graded granite metal coarse aggregates @0.68cum and fine aggregates @ 0.45cum, with superplastisiser @3lts confirming to IS 9103 1999 Reaffirmed-2008 MoRT&H Specification No. 1500, 1600 & 1700 - i) Upto 5m height.	Cum							
	P. No. 237&238 INo 29.14.1 of PW,P&IWTD SR 2012-13)								
	CH:1958.00 to1974.50								
	Top Slab		1	35.00	19.80	0.65	450.45		
						Say	450.50	6500.52	2928484.00

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
3.27	KSRB M2300 2.12: Furnishing and Placing Reinforced / Prestressed Cement Concrete in **Super-structure** as per drawing and technical specification complete as per specifications. A. RCC- with OPC cement **design mix M20** @ 320kgs, with 20mm and down size graded granite metal coarse aggregates @ 0.69cum and fine aggregates @ 0.46cum, with superplastisiser @ 3lts conforming to IS9103-1999 Reaffirmed-2008. Case-II: Using Batching Plant, Transit Mixer & Concrete Pump, MoRT&H Specification No. 1500, 1600 & 1700 - i) Upto 5m height.	Cum							
	P.No 234 INo 29.4.1 of PW,P&IWTD SR 2012-13)								
	CH:1958.00 to1974.50								
	Area of Crash Barrier = 0.386 Sqm		2	20.00	0.386		15.44		
	Footpath		2	20.00	2.50	0.15	15.00		
							30.44		
						Say	**30.50**	5589.00	**170465.00**
3.28	KSRRB M2300 - 14. Supplying, fitting and placing **TMT bar reinforcement in super - structure** complete as per drawing and technical specifications complete as per specifications MoRT&H Specification No. 1600	MT							
	(P.No.243, I.No.29.29 of PW, P&IWTD S.R 2012-13)								
	Considering 130kg/cum			--	--	--	**60.57**	68891.04	**4172882.00**
3.29	KSRRB M600-1. Construction of **dry lean cement concrete mix M5** with OPC cement @ 160Kgs, with 25mm and down size graded granite metal coarse aggregate at 0.86cum and fine aggregates @ 0.58cum Sub-base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per Table 600-1, cement content not to be less than 160 kg/cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with 8-10 tonnes vibratory roler, finishing and curing complete as per specifications. MoRT&H Specification No. 601	Cum							
	P. No.186 INo 22.1 of PW,P&IWTD SR 2012-13)								
	CH:1958.00 to1974.50								
	For DrainTop		1	35.00	16.50	0.30	173.25		
						Say	**173.50**	2880.36	**499742.00**

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Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
3.30	KSSRB M2200 - 9. Providing and laying **Filter Media** with granular materials / stone crushed aggregates satisfying the requirements laid down in clause 2500.4.2.2. of MoRT&H specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and provided over the entire surface behind abutment, wing wall and return wall to the full height compacted to a firm condition complete as per drawing and Technical Specification complete as per specifications MoRT&H Specification No. 710.1.4 of IRC: 78 & 2200	Cum							
	(P.No.230, I.No.28.13 of PW,P&IWTD S.R 2012-13)								
	CH:1958.00 to1974.50								
	For Box Portion		2	35.00	0.60	6.15	258.30		
	For Retaining Wall		4	10.00	0.60	6.15	147.60		
							405.90		
						Say	406.00	650.16	263965.00
3.31	KSRRB M2200 - 8.1. **Back filling** behind abutment, wing wall and return wall complete as per drawing and Technical Specification complete as per specifications. A. Granular Material MoRT&H Specification No. 710.1.4 of IRC: 78 & 2200	Cum							
	(P.No.230, I.No,28.11 of PW,P&IWTD S.R 2012-13)								
	CH:1958.00 to1974.50								
	For Box Portion		2	35.00	0.45	6.15	193.73		
	For Retaining Wall		4	10.00	1.40	6.15	344.40		
							538.13		
						Say	538.50	262.44	141324.00
3.32	KSSRB M220 - 8. Providing **Weep holes** in Brick masonry / Plain / Reinforced concrete abutment, wing wall / return wall with 100mm dia AC pipe, extending through the full width of the structure with slope of 1V:20H towards drawing foce. Complete as per drawing and Technical specifications complete as per specifications. MoRT&H Specification No. 2706 & 2200	Nos./ Mtr							
	PNo 230 INo 28.10 of PW,P&IWTD S.R 2012-13)								
	CH:1958.00 to1974.50								
	Box Portion		2X3X35	0.65	--	--	136.50		
	Retaining Wall		4X3X10	0.65	--	--	78.00		
							214.50		
						Say	214.50	148.23	31795.00
3.33	KSRRB 800-1. **Painting two coats** after filling the surface with synthetic enamel paint in approved shades on new plastered concrete surfaces, with materials, labour complete as per specifications. MoRT&H Chapter 8	Sqm							
	(P.No.192, I.No. 24.1 of PW,P&IWTD SR 2012-13)								
	Crash Barrier								
	CH:1958.00 to1974.50		2	20.00	--	2.30	92.00		
						Say	92.00	[illegible]	4302.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
3.34	KSRRB M2700-5. **Drainage Spouts** complete as per drawing and Technical Specification complete as per specifications. MoRT&H Specification No. 2705	No.							
	(P.No.252, I.No.32.5 of PW,P&IWTD S.R 2012-13)								
	At 4m interval on both sides		2	5	--	--	10	1270.08	12701.00
									25935280.00
3.35	Miscellaneous and Rounding off								720.00
				Total Cost for RCC Slab Culvert for Storm Water Drain					**25936000.00**

Assistant Executive Engineer
Traffic Engineering Cell,
Bruhath Bangalore Mahanagara Palike
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Executive Engineer
Traffic Engineering Cell (Road Infra)
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Bangalore - 560 002.

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಟ್ರಾಫಿಕ್-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Detailed Cost Estimate

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
4.00	**Diversion Road**								
4.01	KSRRB 3000 **Filling Pot - holes and Patch Repairs with Bituminous Concrete, 40mm** KSRRB M3000-5: Removal of all field material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation as per clause 500.3, back filling the pot holes with hot bituminous material as per clause 500.4, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2 complete as per specifications MoRT&H Specification No. 3004.2	Sqm							
	(P.No.262, I.No.35.5, PW, P & IWTD SR 2011-12)								
	Surface level Roads								
	LHS and RHS		2	2405.63	6.50		31273.19		
	Up Ramp and Down Ramp		2	165.00	6.50		2145.00		
	Battery limit								
	Elevated Corridor(Both sides)		2	100.00	21.00		4200.00		
	Up Ramp and Down Ramp(Both sides)		2	100.00	22.00		4400.00		
	Obligatory Span								
	40.00m		1	32.00	11.70		374.40		
	30.00m		5	22.00	11.70		1287.00		
	25.00m		2	17.00	11.70		397.80		
							44077.39		
	Consider 1.5% of Area						661.16	395.82	261700.69
4.02	KSRRB 200-7.Providing and applying tack coat on prepared black topped surfaces at **2.5 kg per 10 sqm**,heating bitumen in boiler fitted with spray set (Excluding cleaning of road surface) incuding cost of all materials, labour,HOM of machineries complete as per specifications. MORTH/Chapter 5	Sqm							
	(P.No. 173 I.No.21.7 of PW,P&IWTD S.R 2012-13)								
	Qty same Item No-4.01			44077.39			44077.39	17.12	754516.76

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ವಿಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
4.03	Providing and laying **bituminous concrete** with 100 - 120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder at 5.4 to 5.6% of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H specification clause No. 500.9 complete in all respects as per specifications. --30-45mm compacted thickness (Grading II) with 6% Bitumen 60/70. MoRT&H Specification No. 509	Cum							
	(P.No.176 of I.No.21.22.4 in PW,P&IWTD S.R 2012-13)								
	Surface level Roads								
	LHS and RHS		2	2405.63	7.00	0.04	1347.15		
	Up Ramp and Down Ramp		2	165.00	6.50	0.04	85.80		
	Battery limit								
	Elevated Corridor		2	100.00	21.00	0.04	168.00		
	Up Ramp and Down Ramp		2	100.00	25.00	0.04	200.00		
	Obligatory Span								
	40.00m		1	32.00	11.70	0.04	14.98		
	30.00m		5	22.00	11.70	0.04	51.48		
	25.00m		2	17.00	11.70	0.04	15.91		
							1883.32	11177.44	21050702.23
4.04	KSRRB M800- **Portable barricade in construction Zone** KSRRBB M800-43: Installation of a steel portable barricade with horizontal rail 300mm wide, 2.5m in length fitted on a 'A' frame made with 45x45x5mm angle iron section, 1.5m in height, horizontal rail painted (2coats) with yellow and white strips, 150mm in width at an angle of 45, 'A' frame painted with 2 coats of yellow paint, complete as per IRC:SP:55-2001 complete as per specifications.	Each							
	(P.No.199, I.No.24.44 of PW,P&IWTD SR 2012-13)								
			2221.46	--	--	--	2221.00		
	Deduction for Obligetory Span		70.40			--	70.40		
							2150.60	3095.28	6656709.17
4.05	Supplying, fabricating, erecting, and fixing in position, inserts and embedments, Truss, clamps, brackets, insert plates and all miscellaneous steel works as shown in drawing and as directed by the Engineer at all depths, using MS angles, channels, steel beams, rails, tees, plates, flats, rounds squares etc., of various sizes and other structural section confirming IS 2062 grade A, medium class GI pipes etc., including straighting, cutting, fabricating, welding,	MT							

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	bending to slope fixing to position, welding to insert plate embeded in concrete and inclusive of 2coats of enamel paint over one coat of metal primer. The rate quoted is to include the cost of all materials, labour, tools, tackets, cranes, devices and plants, wastage etc., as per specifications and drawings complete. Including cost of bolts, nuts, washers, clamps, welding, electrodes, and connections required for the work. Rate to include shims and packing peices etc., complete with all lead and lifts as directed by the Engineer-in-charge.								
	Data Rate								
	MS Sheet 2mm thick for Barricading								
	((2405.63+170+165)*2)+7.3+7.3+6.7+6.7 x 1.5 x 0.002 x 7850 =129743.07kg Say 129.74MT			5509.26	129743.07	--	129.74		
	Deduction for Obligetory Span			176.00	4144.80	--	4.14		
							125.60	72000.00	9043075.66
4.06	Providing and fixing **Project Display Board** of size 1.80 vertical x 1.60 mtrs. Horizontal made of cold rolled coil 16 Gauge (1.6mm thickness) sheeting strengthened by welding to MS angle of size 35x35x5mm iron framework on all sides, extra cross vertical angle fixed using nuts and bolts, base of the board shall be cleaned, applying red oxide	Nos.							
	and black paint by sprayer on both sides of the board and all MS iron frameworks, background of the facing side of the board painted in traffic yellow, project information written in English / Kannada / Hindi, painting letters and numeral in black, fixed on a mild steel angle iron post 75 mm x 75 mm x 6mm, 2Nos. firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45 x 45 x 60 cm. 60cm below ground level and the board 2.8m from ground level as per approved drawing including cost of all materials, labour, unloading, curing backfilling, transporting etc., complete.								
	(P. No.81, Item no 8.47 of NHSR 2009-10)		9	2.00	--	--	18.00		
	500mtrs Each on Both sides						18.00	7960.60	143290.80
									37909995.30
4.07	Miscellaneous and Rounding off								2004.70
							Total Cost of Diversion Road		37912000.00

Assistant Executive Engineer
Traffic Engineering Cell,
Bruhath Bangalore Mahanagara Palike
Bangalore - 560 002.

Executive Engineer
Traffic Engineering Cell (Road Infra)
Bruhat Bangalore Mahanagara Palike
Bangalore - 560 002.

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Detailed Cost Estimate

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
5.00	WORKS FOR OBLIGATORY SPANS AND STANDARD SPANS OF ELEVATED CORRIDOR								
5.01	KSRRB M2100 - Excavation in Ordinary Soil KSRRB M2100 - 2.1. Earth work in excavation for foundation of structures as per drawing and technical specifications, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material complete as per specifications. B. Mechanical Means (i) Depth upto 3m.	Cum							
	Add 10% for dewatering charges								
	(P.No.221, I.No.27.4 of PW,P&IWTD S.R 2012-13)								
	For Pile cap								
	Obligatory Span		14	9.70	9.70	2.25	2963.84		
	Standard Span		78	5.30	8.30	1.95	6690.88		
	25m Obligatory Span		3	5.30	8.30	1.95	257.34		
	Up Ramp Pier		3	5.30	8.30	1.95	257.34		
	Down Ramp Pier		3	5.30	8.30	1.95	257.34		
							10426.74		
						Say	10427.00	44.37	462665.00
5.02	KSRRB M2100 - 13. Plain Cement Concrete M15 with OPC cement @240kgs, with 40mm and down size graded granite metal coarse aggregates @ 0.84cum and fine aggregates @ 0.56cum in Open Foundation complete as per Drawing and Technical Specifications MoRT&H Specification No. 1500, 1700 & 2100								
	(P.No.223, I.No.27.24 of PW,P&IWTD S.R 2012-13)								
	For Pile cap								
	Obligatory Span		14	8.90	8.90	0.15	166.34		
	Standard Span		78	4.50	7.50	0.15	394.88		
	25m Obligatory Span		3	4.50	7.50	0.15	15.19		
	Up Ramp Pier		3	4.50	7.50	0.15	15.19		
	Down Ramp Pier		3	4.50	7.50	0.15	15.19		
							606.78		
						Say	607.00	3892.32	2362638.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in : Rs.	Amount in Rs.
5.03	KSRRB 1100 - 3.1 - Bored cast - in - situ R. C. C. Piles KSRRB 1100 - 3.1. Bored cast - in -situ RCC Pile with OPC cement design mix M35 @390kgs, with 20mm and down size graded granite metal coarse aggregates @ 0.68cum and fine aggregates @ 0.45cum, with superplastisiser @ 3lts conforming to IS9103-1999 Reaffirmed-2008, excluding Reinforcement complete as per Drawing and Technical Specifications and removal of excavated earth with all lifts and lead upto 1000m complete as per specifications.	Rmt							
	For Drilling of Pile								
	Obligatory Span								
a	KSRRB M1100-3.3 C. Pile Diameter = **1200mm**, MoRT&H specifications No. **1100** & 1700								
	(P.No.202, I.No.25.5 of PW,P&IWTD S.R 2012-13)								
	14 nos of pier X 8Piles each pier=112		112		--	15.00	1680.00	10248.12	17216842.00
	25m Obligatory Span								
b	KSRRB M1100-3.2 B. Pile Diameter = **1000mm**, MoRT&H specifications No. **1100**, 1600 & 1700		24		--	15.00	360.00	7919.64	2851070.00
	3 nos of pier X 8Piles each pier=24								
	Standard Span								
c	KSRRB M1100-3.2 B. Pile Diameter = **1000mm**, MoRT&H specifications No. **1100**, 1600 & 1700		468		--	15.00	7020.00	7919.64	55595873.00
	78 nos of pier X 6Piles each pier=468								
	(P.No.202, I.No.25.4 of PW,P&IWTD S.R 2012-13)								
	Up Ramp Pier								
d	KSRRB M1100-3.2 B. Pile Diameter = **1000mm**, MoRT&H specifications No. **1100**, 1600 & 1700		18		--	15.00	270.00	7919.64	2138303.00
	3 nos of pier X 6Piles each pier=18								
	Down Ramp Pier								
e	KSRRB M1100-3.2 B. Pile Diameter = **1000mm**, MoRT&H specifications No. **1100**, 1600 & 1700		18		--	15.00	270.00	7919.64	2138303.00
	3 nos of pier X 6Piles each pier=18								
	(P.No.202, I.No.25.4 of PW,P&IWTD S.R 2012-13)								
5.04	**(A) Doing Initial vertical load test for a design pile load of 270 Tons** including cost of all equipment, men and material, reaction piles etc (if required) required for the setup complete as per drawing and technical specification and as directed by the Engineer in Charge.	Nos							
	(P.No.150, I.No.12.37(a) of NH S.R 2009-10)		3	--	--	--	3.00	85860.00	257580.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಜೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
5.05	(B) Doing Horizontal load test for a design pile load of 20 Tons including cost of all equipment, men and material, reaction piles etc (if required) required for the setup complete as per drawing and technical specification and as directed by the Engineer in Charge.	Nos							
	(P.No.150, I.No.12.37(b) of NH S.R 2009-10)		3	--	--	--	3.00	106000.00	318000.00
5.06	KSRRB M1200-47: Providing steel liner 10mm thick for curbs and 6mm thick for seining of wells including fabricating and setting out as per detailed drawing complete as per specifications. MoRT&H Specifications No.1200 & 1900	MT							
	(P.No.218, I.No.26.125 of PW,P&IWTD S.R 2012-13)								
	Casing for Piles								
	Obligatory Span		112	12.00	0.178	--	238.64		
	25m Obligatory Span		24	12.00	0.148	--	42.62		
	Standard Span		468	12.00	0.148	--	831.10		
	Up Ramp Pier		18	12.00	0.148	--	31.96		
	Down Ramp Pier		18	12.00	0.148	--	31.96		
	3.142*1.2*0.006*7.85 = 0.178						1176.28		
	3.142*1*0.006*7.85 = 0.148					Say	1176.50	80395.20	94584953.00
5.07	KSRRB M1100 - 11.2 Cement Concrete for Reinforced Concrete in Pile Cap as per Drawing and Technical Specification complete as per specifications. D.RCC with OPC cement design mix M35 @ 390kgs, with 20mm down size graded granite metal coarse aggregates @ 0.68cum and fine aggregates @ 0.45cum, with superplastisiser @ 3lts conforming to IS9103-1999 Reaffirmed-2008. Case - II: Using Batching Plant, Transit Mixer and Concrete Pump. MoRT&H Specification No. 1100, 1500 & 1700.	Cum							
	(P.No.204, I.No.25.25 of PW,P&IWTD S.R 2012-13)								
	For Pile cap								
	Obligatory Span		14	8.70	8.70	1.80	1907.39		
	25m Obligatory Span		3	4.30	7.30	1.50	141.26		
	Standard Span		78	4.30	7.30	1.50	3672.63		
	Up Ramp Pier		3	4.30	7.30	1.50	141.26		
	Down Ramp Pier		3	4.30	7.30	1.50	141.26		
							6003.78		
						Say	6004.00	5300.64	31825043.00
5.08	KSRRB M2300 - 14. Supplying, fitting and placing TMT bar reinforcement in sub - structure complete as per drawing and Technical Specifications complete as per drawing and Technical Specifications MoRT&H Specification No. 1600 & 2200 Sub Structure	MT							
	(P.No.230, I.No.28.8 of PW, P&IWTD SR 2012-13)								
	For Pile Cap - 120kg/cum		--	6004.00		--	720.48		
	For Piles - 100kg/cum			9600.00			960.00		
							1680.48		

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
						Say	1680.50	68178.24	114573532.00
5.09	KSRRB 2200-5.18 Design Mix M35 with OPC cement @ 390kgs, with 20mm and down size graded granite metal coarse aggregates @ 0.68cum and fine aggregates @ 0.45cum, with superplastisiser @ 3lts conforming to IS9103-1999 Reaffirmed-2008 - **i) Upto 5m height.**	Cum							
	(P.No.229, I.No.28.7.18 of PW,P&IWTD S.R 2012-13)								
	Pier								
	Obligatory Span Pier		14	2.50	2.50	5.84	511.31		
	25m Obligatory Span		3	2.50	2.50	5.64	105.75		
	Standard Span Pier		78	2.50	2.50	5.69	2774.63		
	Up Ramp		3	2.54		5.61	42.83		
	Down Ramp		3	2.54		5.52	42.14		
							3476.66		
	Pedestal								
	Standard Span=(76*4+end Pier 2*2=308)		308	0.90	0.90	0.30	74.84		
	Obligatory Span=(17*4=68)		68	0.90	0.90	0.30	16.52		
	Up Ramp =(2*4+end Pier 1*2=10)		10	0.90	0.90	0.30	2.43		
	Down Ramp =(2*4+end Pier 1*2=10)		10	0.90	0.90	0.30	2.43		
							96.23		
	Pier Beam								
	Standard Span Pier Beam		78	10.00	2.75	1.00	2145.00		
	Trapizoidal Area=6.8Sqm		78	2.75	6.80		1458.60		
	40 m Obligatory Pier Beam		2	10.00	2.75	1.00	55.00		
	Trapizoidal Area=6.8Sqm		2	2.75	6.80		37.40		
	30 m Obligatory Pier Beam		12	10.00	2.75	1.00	330.00		
	Trapizoidal Area=6.8Sqm		12	2.75	6.80		224.40		
	25m Obligatory Pier Beam		3	9.00	2.75	1.00	74.25		
	Trapizoidal Area=5.32Sqm		3	2.75	5.32		43.89		
	Up and Down Ramp Pier Beam		6	4.50	2.75	0.75	55.69		
	Trapizoidal Area=1.88Sqm		6	2.75	1.88		31.02		
							4455.25		
	Pier Protection								
	For Obligatory Span 40m& 30m Pier Length=(2.5+0.75+0.75+0.25+0.25)*2=9.0		14	9.00	0.25	1.95	61.43		
	length=(2.5+0.75+0.75)*2=8.00		14	8.00	0.25	1.95	54.60		
	For Obligatory Span 25mPier Length=(2.5+0.75+0.75+0.25+0.25)*2=9.0		3	9.00	0.25	1.95	13.16		
	length=(2.5+0.75+0.75)*2=8.00		3	8.00	0.25	1.95	11.70		
	For Standard Span Pier Length=(2.5+0.75+0.75+0.25+0.25)*2=9.0		78	9.00	0.25	1.95	342.23		
	length=(2.5+0.75+0.75)*2=8.00		78	8.00	0.25	1.95	304.20		
	Up Ramp length=(1.8+0.75+0.75)*3.142=10.37		3	10.37	0.25	1.95	15.16		
	DownRamp length=(1.8+0.75+0.75)*3.142=10.37		3	10.37	0.25	1.95	15.16		
							817.64		
							8845.78		
						Say	8846.00	5795.28	51265047.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋಜನೆ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
5.10	KSRB 2.6: **Providing and filling sand** in foundation upto plinth to required depth for sub soil treatment including watering ramming with all lead and lift complete as per Specifications. Specification. No. KBS 2.10.2	Cum							
	P.No 6 INo 2.13 of PW,P&IWTD S.R 2012-13)								
	For Obligator Span		17	13.00	0.75	1.50	248.63		
	For Standaad Span		78	13.00	0.75	1.50	1140.75		
	Up Ramp and Down Ramp		6	10.37	0.75	1.50	69.99		
							1459.36		
						Say	1460.00	1298.16	1895314.00
5.11	KSRRB 2300 - 11.3. Furnishing and Placing Reinforced / Prestressed cement concrete in super structure as per drawing and Technical Specification complete as per specifications. F.PSC with OPC cement design mix M45 @450kgs, with down size graded granite metal coarse aggregates @0.66cum and fine aggregates @0.44cum, with superplastisiser @4lts conforming to IS9103-1999 Reaffirmed-2008 MoRT&H Specification No.1500, 1?00 & 1700---Height 5m to 10m	Cum							
	(P.No.242, I.No.29.26.2 of PW,P&IWTD S.R 2012-13)								
	Box Girder for Obligatory span(Super Structure)								
	40 m Obligatory span@ 12.39Sqm		40.00	--	--	12.39	495.60		
	30 m Obligatory span@ 11.04Sqm		30.00	--	--	11.04	331.20		
	30 m Obligatory span@ 11.04Sqm		30.00	--	--	11.04	331.20		
	30 m Obligatory span@ 11.04Sqm		30.00	--	--	11.04	331.20		
	30 m Obligatory span@ 11.04Sqm		30.00	--	--	11.04	331.20		
	30 m Obligatory span@ 11.04Sqm		30.00	--	--	11.04	331.20		
	28.15 m Obligatory span@ 11.04Sqm		28.15	--	--	11.04	310.78		
	25 m Obligatory span@ 10.98 Sqm		25.00	--	--	10.98	274.50		
	26 m Obligatory span@ 10.98 Sqm		25.00	--	--	10.98	274.50		
	40mUp Ramp Obligatory span @ 9.05 Sqm		40.00	--	--	9.05	362.00		
	40mDownRampObligatory span@ 9.05 Sqm		40.00	--	--	9.05	362.00		
						Say	3735.38	7930.44	29623175.00
5.12	KSRRB M2300-10.2, Furnishing and Placing Reinforced / Prestressed cement concrete in super - structure as per drawing and Technical Specification complete as per specifications. RCC with OPC cement design mix M40 @ 420kgs, with 20mm and down size graded granite metal coarse aggregates @ 0.67cum and fine aggregates @ 0.44cum, with superplastisiser @ 3lts conforming to IS9103-1999 Reaffirmed-2008 Case - II: Using Batching Plant, Transit Mixer & Cocnrete Pump MoRT&H Specification No. 1500, 1600 & 1700, Height 5m to 10m	Cum							
	(P.No.240 and 241, I.No.29.22.2 of PW,P&IWTD S.R 2012-13)								
	Standard Span Girder								
	50m Viaduct (length=25-(0.02-0.9)*2=23.16)								
	Top-Haunch (7Girderx2 Span=14)		14	23.16	0.02		7.30		
	Rib		14	23.16	0.20	1.05	68.09		

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Battom Haunch		14	23.16	0.02		7.30		
	Battom Slab		14	23.16	0.50	0.30	48.64		
	437.14m Viaduct(length=21.87-(0.02-0.9)*2=20.03)								
	Top Haunch (7Girderx20 Span=140)		140	20.03	0.02		63.09		
	Rib		140	20.03	0.20	1.05	588.88		
	Battom Haunch		140	20.03	0.02		63.09		
	Battom Slab		140	20.03	0.50	0.30	420.63		
	197.81m Viaduct (length=21.87-(0.02-0.9)*2=20.16)								
	Top Haunch (7Girderx9 Span=63)		63	20.16	0.02		28.58		
	Rib		63	20.16	0.20	1.05	266.72		
	Battom Haunch		63	20.16	0.02		28.58		
	Battom Slab		63	20.16	0.50	0.30	190.51		
	107.50m Viaduct(length=21.50-(0.02-0.9)*2=19.66)								
	Top Haunch (7Girderx5 Span=35)		35	19.66	0.02		15.48		
	Rib		35	19.66	0.20	1.05	144.50		
	Battom Haunch		35	19.66	0.02		15.48		
	Battom Slab		35	19.66	0.50	0.30	103.22		
	65.06m Viaduct (length=21.68-(0.02-0.9)*2=19.84)								
	Top Haunch (7Girderx3 Span=21)		21	19.84	0.02		9.37		
	Rib		21	19.84	0.20	1.05	87.49		
	Battom Haunch		21	19.84	0.02		9.37		
	Battom Slab		21	19.84	0.50	0.30	62.50		
	325.27m Viaduct (length=21.68-(0.02-0.9)*2=19.84)								
	Top Haunch (7Girderx15 Span=105)		105	19.84	0.02		46.87		
	Rib		105	19.84	0.20	1.05	437.47		
	Battom Haunch		105	19.84	0.02		46.87		
	Battom Slab		105	19.84	0.50	0.30	312.48		
	184.23m Viaduct (length=21.47-(0.02-0.9)*2=19.63)								
	Top Haunch (7Girderx9 Span=63)		63	19.63	0.02		27.83		
	Rib		63	19.63	0.20	1.05	259.70		
	Battom Haunch		63	19.63	0.02		27.83		
	Battom Slab		63	19.63	0.50	0.30	185.50		
	409.40m Viaduct(length=21.47-(0.02-0.9)*2=19.63)								
	Top Haunch (7Girderx20 Span=140)		140	19.63	0.02		61.83		
	Rib		140	19.63	0.20	1.05	577.12		
	Battom Haunch		140	19.63	0.02		61.83		
	Battom Slab		140	19.63	0.50	0.30	412.23		
	50m Viaduct (length=25-(0.02-0.9)*2=23.16)								
	Top Haunch (7Girderx2 Span=14)		14	23.16	0.02		7.30		

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Rib		14	23.16	0.20	1.05	68.09		
	Battom Haunch		14	23.16	0.02		7.30		
	Battom Slab		14	23.16	0.50	0.30	48.64		
	Up Ramp Viaduct @ 9.05 Sqm		1	30.00	--	9.05	271.50		
	Down Ramp Viaduct @ 9.05 Sqm		1	30.00	--	9.05	271.50		
							5360.71		
	End Diaphgram		156	16.00	0.90	1.60	3594.24		
	Deck Slab for Standard Span		1	1826.41	17.00	0.20	6209.79		
	Area of Crash Barrier =0.350 Sqm		2	2094.50	0.350		1466.15		
	Up and Down Ramp Area of Crash Barrier =0.456 Sqm		4	70.00	0.350		98.00		
	Median above Flyover		1	2094.50	1.000	0.300	628.35		
							17357.25		
						Say	17357.50	6713.28	116525758.00
5.13	KSRRB M2200-6. Supplying, fitting and **placing TMT bar reinforcement in sub-structure** complete as per drawing and Technical Specifications complete as per specifications MoRT&H Specification No. 1600 & 2200	MT							
	(P.No.230, I.No.28.8 of PW, P&IWTD S.R 2012-13)								
	Considering 180kg/cum for Pier			3476.66		--	625.80		
	Considering 130kg/cum for Pier Beam			4455.25		--	579.18		
	Considering 150kg/cum for Pedestal			96.23		--	14.43		
	For Pier Protection Consider 40kg/cum			817.64		--	32.71		
							1252.12		
						Say	1252.50	68178.24	85393246.00
5.14	KSRRB M2300 - 14. Supplying, fitting and **placing TMT bar reinforcement in super structure** complete as per drawing and technical specifications complete as per specifications MoRT&H Specification No. 1600 Super structure	MT							
	(P.No.243, I.No.29.29 of PW, P&IWTD S.R 2012-13)								
	Considering 150kg/cum for Standard Span Girder			5360.71		--	804.11		
	Considering 250kg/cum for End Diaphgram			3594.24		--	898.56		
	Considering 160kg/cum for Obligatory span Box Girder			3735.38		--	597.66		
	Considering 125kg/cum for deck Slab			6209.79		--	776.22		
	Considering 130kg/cum for Crash Barrier & Median			2192.50		--	285.03		
							3361.58		
						Say	3362.00	68891.04	231611676.00
5.15	KSRRB M2700-9. Providing, precasting, transportation and placing in position **precast post tensioned concrete girders as per** drawing and technical specifications **complete** as per specifications. MoRT&H Specification No.1800 & 2300	Cum							
	(P.No.253, I.No.32.9 of PW,P&IWTD S.R 2012-13)								
	In each span 7 Girders								
	Girder								
	Girder Qty same as Item No 5.12		1	4817.71			4817.71	20648.52	99478663.00

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು ಬೆಂಗ-ಕೆ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
5.16	KSRRB M2300 - 15. High tensile steel **wires / strands** including all accessories for stressing, stressing operations and grouting complete as per drawing and Technical Specifications complete as per specifications MoRT&H Specification No. 1800	MT							
	(P.No.243, I.No.29.30 of PW,P&IWTD S.R 2012-13)								
	Considering 42kg/m for up to 21m Girder		29	20.47			24.93		
	Considering 63kg/m for up to 25m Girder		20	21.85			27.53		
	Considering 63kg/m for up to 25m Girder		5	21.50			6.77		
	Considering 63kg/m for up to 25m Girder		18	21.68			24.59		
	Considering 63kg/m for up to 25m Girder		9	22.00			12.47		
	Considering 63kg/m for up to 25m Girder		4	25.00			6.30		
	Considering 40kg/cum for Box Girder			3735.38		--	149.42		
							252.01		
						Say	252.20	159054.64	40113631.00
5.17	KSRRB M2200-15: Supplying, fitting and fixing in position true to line and level **POT PTFE bearings** consisting of a metal piston supported by a disc or unreinforced elastomer confined with in a metal cylinder, sealing rings, dust seals, PTFE surface sliding against stainless steel making surface complete assembly to be of cast steel / fabricated structural steel, metal and elastomer elements to be as per IRC: 83 Part I and II respectively and other parts conforming to BS: 5400 section 9.1 and 9.2 and clause 2000.6 of MoRT&H Specification complete as per drawing and approved Technical specifications complete as per specifications. MoRT&H Specification No.2000 & 2200.	Nos.							
	(P.No.231, I.No.28.19 of PW,P&IWTD S.R 2012-13)								
	For Obligatory Span								
	a) Guided/ fixed PTFE bearings 600MT vertical Capacity		14	--	--	--	56.00	220968.00	12374208.00
	b) Guided/ fixed PTFE bearings 380MT vertical Capacity		81	--	--	--	320.00	139946.40	44782848.00
	b) Guided/ fixed PTFE bearings 600MT vertical Capacity(Up Ramp)		3	--	--	--	10.00	220968.00	2209680.00
	b) Guided/ fixed PTFE bearings 600MT vertical Capacity (Down Ramp)		3	--	--	--	10.00	220968.00	2209680.00
5.18	KSRRB M2600-9. Providing and laying of a **strip seal Expansion joint** catering of maximum horizontal movement upto 70 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer / supplier or their authorised representative ensuring compliance to the manufacturer's instructions for installation complete as per specifications. MoRT&H Specification No. 2607	Rmt							
	(P.No. 249, I.No.31.9 of PW,P&IWTD S.R 2012-13)								
	For Flyover		95	17.00	--	--	1615.00		
	For up & Down Ramp		6	6.70	--	--	40.20		
							1655.20	15672.30	25941883.39

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
3.10	Anti carbonate painting with approved colour as per specifications including cost of materials, labour etc., complete as per specifications and as directed by the Engineer in Charge.	Sqm							
	(Market rate)								
	Obligatory Span								
	Bottom slab		1	268.15	20.00	--	5363.00		
	Sides including Crash Barrier		2	268.15	--	2.70	1448.01		
	Pier at Obligatory span		17	10.00	--	5.69	967.56		
	Pier Cap at Obligatory span40m	2	1	16.48		--	32.96		
		2	1	8.90			17.80		
	Pier Cap at Obligatory span30m & 25m	2	16	14.05		--	449.60		
		2	16	8.68			277.76		
	Standard Span								
	Bottom Slab		1	1826.43	20.00	--	36528.60		
	Sides incuding Crash Barrier		2	1826.43	--	2.62	9570.49		
	Pier at Standard span		78	10.00		5.84	4557.99		
	Pier Cap at Standard span	2	78	16.48		--	2570.88		
		2	78	8.90			1388.40		
	Up Ramp								
	Bottom Slab		3	165.00	9.02	--	4464.90		
	Sides incuding Crash Barrier		2	165.00	--	2.77	914.10		
	Pier		3	5.66	--	5.00	84.83		
	Pier Cap	4	3	5.23		--	62.76		
	Down Ramp								
	Bottom Slab		3	170.00	9.02	--	4600.20		
	Sides incuding Crash Barrier		2	170.00	--	2.77	941.80		
	Pier		3	5.66	--	5.00	84.83		
	Pier Cap	4	3	5.23		--	62.76		
							74389.24		1,42,82,880.00
						Say	74390.00	~~200.00~~ 192.00	~~14878000.00~~
[illegible]	MoRTH M2700-1. Providing and laying 12 mm thick mastic asphalt wearing course on top of deck slab excluding prime coat with paving grade bitumen meeting the requirements given in table 500-29, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated fine grained hard stone chipping of 9.5 mm nominal size at the rate of 0.005 cum per 10 sqm and at an approximate spacing of 10 cm center to center in both directions, pressed into surface when the temperature of surfaces is not less than 100deg. C, protruding 1 mm to 4 mm over mastic surface, complete as per clause 5100.5 complete as per specifications. MoRT&H Specification No. 515 & 2702	Sqm							
	(P No.[illegible], I.No.32.1 of PW,P&IWTD S.R 2012-13)								
	Fly over section		2	2094.56	7.50	--	31418.40		
	Up Ramp		1	70.00	5.50	--	385.00		
	Down Ramp		1	70.00	5.50	--	385.00		
							32188.40		
						Say	32189.00	258.12	8308625.00

ಮಾಹಿತಿಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
5.21	KSRRB 200-7.Providing and applying tack coat on prepared black topped surfaces at 2.5 kg per 10 sqm,heating bitumen in boiler fitted with spray set (Excluding cleaning of road surface) incuding cost of all materials, labour,HOM of machineries complete as per specifications. MORTH/Chapter 5	Sqm							
	(P.No. 173 I.No.21.7 of PW,P&IWTD S.R 2012-13)								
	Fly over section		2	2094.56	7.50	--	31418.40		
	Up Ramp		1	70.00	5.50	--	385.00		
	Down Ramp		1	70.00	5.50	--	385.00		
							32188.40		
						Say	32189.00	17.12	551011.00
5.22	KSRRB M500-19. Providing and laying **bituminous concrete 40 mm thick** with 100 - 120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder at 5.4 to 5.6% of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H Specification clause No. 500.9 complete in all respects as per specifications. MoRT&H Specification No. 509 with 6% Bitumen 60/70 grade using 40 - 60 HMP	Cum							
	(P.No.176 of I.No.21.22.4 in PW,P&IWTD S.R 2012-13)								
	Fly over section		2	2094.56	7.50	0.04	1256.74		
	Up Ramp		1	70.00	5.50	0.04	15.40		
	Down Ramp		1	70.00	5.50	0.04	15.40		
							1287.54		
						Say	1288.00	11177.44	14396541.00
5.23	KSRRB M2700-5. **Drainage Spouts** complete as per drawing and Technical specification complete as per specifications. MoRT&H Specification No. 2705	No.							
	(P.No.252, I.No.32.5 of PW,P&IWTD S.R 2012-13)								
	At 8m interval on both sides		2	279	--	--	559	1270.08	709517.00
5.24	KSRB 13-8.5: Providing and fixing to wall, ceiling and floor, low density **polythylene pipes 6.00 kgf/sq.cm working pressure 160mm outside diameter** with special Flange, compression type fittings, wall clips, making good the wall, ceiling and floor including cost of all materials, labour charges, HOM of equipments and testing complete as per specifications.	m							
	(P.No.101, I.No.13.70.6 of PW,P&IWTD S.R 2012-13)								
	PVC Pipe for rain water disposal	2	559	6	--	--	6703.68	637.20	4271585.00

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
5.40	KSRRM M2700 -4. Providing fitting and fixing mild steel railing complete as per drawing and technical Specification. Complete as per MoRT&H Specification No. 2703, 1000	m							
	(P.No. 252, I.No. 32.4 of PW, P & IWTD S.R 2012 -		2	2234.56	--	--	4469.12	3465.72	15488719.00
5.20	KSRD 2.3: Filling available Excavated Earth (excluding rock) in sides of foundations upto plinth in layers not exceeding 20cms in depth, compacting each deposited layer by ramming after watering with lead upto 50m and lift upto 1.50m including cost of all labour complete as per specifications. Specification No.KBS 2.9	Cum.							
	(P.No.6, I.No.2.10 of PW, P&IWTD S.R 2012-13)								
	For foundation								
	Same as Qty of Item No.5.01-5.02-5.06		--	--	--	--	5030.00		
						Say	5030.00	90.72	456322.00
5.41	KSRRD M100-4.2. Haulage of materials by tipper including cost of loading, unloading and stacking complete as per specifications. MoRT&H Chapter 1 Case-I : Surface Road	Cum							
	(P. No.147 of PW, P&IWTD S.R 2012-13)								
	Unit same as item no 5.01-5.25								
	For 20Km RS. 2.00 X 1.3 X 20 = (52.00 + 66.30)X1.08=123.34								
			1	5397.00			5397.00	123.34	665644.00
5.42	Miscellaneous & Rounding off						1126880455 599544.6		1127475575.39 4424.61
	Total cost of Works for Obligatory Span and Standard Span of Elevated Corridor								1127480000.00

Assistant Executive Engineer
Traffic Engineering Cell,
Bruhath Bangalore Mahanagara Palike
Bangalore - 560 002.

Executive Engineer
Traffic Engineering Cell (Road Infra)
Bruhat Bangalore Mahanagara Palike
Bangalore - 560 002.

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Detailed Cost Estimate

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
6.00	APPROACHES TO ELEVATED CORRIDORS								
6.01	KSRRB M2100 - 1.1. **Earthwork** in excavation for foundation of structures as per drawing and technical specifications, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material complete as per specifications. I. Ordinary Soil - A. Manual Means **(i) Depth upto 3m.** MoRT&H Specification No. 304	Cum							
	Add 10% extra for dewatering charges								
	(P.No.221, I.No.27.1 of PW,P&IWTD S.R 2012-13)								
	R.E Wall								
	From Kendriya sadana towards Ejipura		2	192.46	1.50	1.50	866.07		
	From Ejipura junction towards Domlur		2	118.62	1.50	1.50	533.79		
	for RE walls behind abutments		2	17.00	1.50	1.50	76.50		
	From Madiwala towards Ejipura (Up Ramp)		2	164.75	1.50	1.50	741.38		
	From Ejipura towards Sarjapura(Down Ramp)		2	169.21	1.50	1.50	761.45		
	for RE walls behind abutments		2	6.70	1.50	1.50	30.15		
							3009.33		
						Say	3010.00	89.04	268012.00
6.02	KSRRB M2100 - 13. **Plain Cement Concrete M15** with OPC cement @ 240kgs, with 40mm and down size graded granite metal coarse aggregates @ 0.84cum and fine aggregates @ 0.56cum in Open Foundation complete as per Drawing and Technical Specifications MoRT&H Specification No. 1500, 1700 & 2100	Cum							
	(P.No.223, I.No.27.24 of PW,P&IWTD S.R 2012-13)								
	a. R.E Wall								
	From Kendriya sadana towards Ejipura		2	192.46	1.50	0.15	86.61		
	From Ejipura junction towards Domlur		2	118.62	1.50	0.15	53.38		
	for RE walls behind abutments		2	17.00	1.50	0.15	7.65		
	From Madiwala towards Ejipura (Up Ramp)		2	164.75	1.50	0.15	74.14		
	From Ejipura towards Sarjapura(Down Ramp)		2	169.21	1.50	0.15	76.14		
	for RE walls behind abutments		2	6.70	1.50	0.15	3.02		
	b. Friction Slab								
	From Kendriya sadana towards Ejipura		2	192.46	2.00	0.15	115.48		
	From Ejipura junction towards Domlur		2	118.62	2.00	0.15	71.17		
	From Madiwala towards Ejipura (Up Ramp)		2	164.75	2.00	0.15	98.85		
	From Ejipura towards Sarjapura(Down Ramp)		2	169.21	2.00	0.15	101.53		
	c. Approach Slab								
	From Kendriya sadana towards Ejipura		1	17.00	4.00	0.15	10.20		
	From Ejipura junction towards Domlur		1	17.00	4.00	0.15	10.20		
	From Madiwala towards Ejipura (Up Ramp)		1	6.70	4.00	0.15	4.02		
	From Ejipura towards Sarjapura(Down Ramp)		1	6.70	4.00	0.15	4.02		
							716.40		
						Say	717.00	3892.00	27907[illegible]93.00

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
6.03	KSRRB M2100 - 17.1. Plain / Reinforced Cement Concrete design mix M25 with OPC cement @340kgs, with 20mm and down size graded granite metal coarse aggregates @ 0.7cum and fine aggregates @0.47cum, with superplastisiser @3lts conforming to IS9103-1999 Reaffirmed-2008, Open Foundation complete as per Drawing and Technical Specifications. Case - 1: Using Concrete Mixer. MoRT&H Specification No. 1500, 1700 & 2100.	Cum							
	(P.No. 224, I.No.27.30 of PW,P&IWTD S.R 2012-13)								
	R.E Wall								
	From Kendriya sadana towards Ejipura		2	192.46	1.40	0.30	161.67		
	From Ejipura junction towards Domlur		2	118.62	1.40	0.30	99.64		
	for RE walls behind abutments		2	17.00	1.40	0.30	14.28		
	From Madiwala towards Ejipura (Up Ramp)		2	164.75	1.40	0.30	138.39		
	From Ejipura towards Sarjapura(Down Ramp)		2	169.21	1.40	0.30	142.14		
	for RE walls behind abutments		2	6.70	1.40	0.30	5.63		
							561.74		
						Say	562.00	5126.76	2881239.00
6.04	KSRRB M2300-10.2. Furnishing and Placing Reinforced / Prestressed cement concrete in super - structure as per drawing and Technical Specification complete as per specifications. RCC with OPC cement design mix M - 40 @ 420kgs, with 20mm and down size granite metal coarse aggregates @ 0.7cum and fine aggregates @ 0.44cum, with superplastisiser @ 3lts confirming. IS9103-1999 Reaffirmed-2008 Case-II: Using Batching Plant, Transit Mixer & Cocnrete Pump MoRT&H Specification No. 1500, 1600 & 1700, Height 5m to 10m	Cum							
	(P.No.240&241, I.No.29.22.2 of PW,P&IWTD S.R 2012-13)								
	Friction Slab								
	From Kendriya sadana towards Ejipura		2	192.46	2.00	0.40	307.94		
	From Ejipura junction towards Domlur		2	118.62	2.00	0.40	189.79		
	for RE walls behind abutments		2	17.00	2.00	0.40	27.20		
	From Madiwala towards Ejipura (Up Ramp)		2	164.75	2.00	0.40	263.60		
	From Ejipura towards Sarjapura(Down Ramp)		2	169.21	2.00	0.40	270.74		
	for RE walls behind abutments		2	6.70	2.00	0.40	10.72		
	Approch Slab		2	17.00	4.00	0.30	40.80		
			2	6.70	4.00	0.30	16.08		
	Area of Crash Barrier = 0.386 Sqm								
	From Kendriya sadana towards Ejipura		2	192.46	0.350		134.72		
	From Ejipura junction towards Domlur		2	118.62	0.350		83.03		
	From Madiwala towards Ejipura (Up Ramp)		2	164.75	0.350		115.33		
	From Ejipura towards Sarjapura(Down Ramp)		2	169.21	0.350		118.45		
	Central Median								
	From Kendriya sadana towards Ejipura		1	192.46	1.00	0.30	57.74		
	From Ejipura junction towards Domlur		1	118.62	1.00	0.30	35.59		
							1671.72		
						Say	1672.00	6713.28	11224604.00

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
6.05	KSRRB M2300 - 14. Supplying, fitting and placing TMT bar reinforcement in super structure complete as per drawing and technical specifications complete as per specifications MoRT&H Specification No. 1600	MT							
	(P.No.243, I.No.29.29 of PW, P&IWTD S.R.2012-13)								
	Considering 130kg/cum			--	--	--	290.42	68891.64	20007386.00
	797.28 X 0.15 = 119.59MT								
6.06	KSRRB M2200 - 8.1. Back filling behind abutment, wing wall and return wall complete as per drawing and Technical Specification complete as per specifications. A. Granular material MoRT&H Specification No. 710.1.4 of IRC: 78 & 2200								
	(P.No.230, I.No.28.11 of PW,P&IWTD S.R 2012-13)								
	R E wall								
	From Kendriya sadana towards Ejipura	Cum	2	192.46	1.20	1.05	485.00		
	From Ejipura junction towards Domlur		2	118.62	1.20	1.05	298.92		
	for RE walls behind abutments		2	17.00	1.20	1.05	42.84		
	Up Ramp		2	164.75	1.20	1.05	415.17		
	Down Ramp		2	169.21	1.20	1.05	426.41		
	for RE walls behind abutments		2	6.70	1.20	1.05	16.88		
							1685.22		
						Say	1686.00	262.44	442474.00
6.07	Providing, casting, erection and assembling of 180 mm thick pre-cast RCC facia panel of M35 grade aesthetically finished cruciform shape mechanically stabilized reinforced earth wall to the required line, grade and cross sections with hot dip high adherence strips and panel lugs of required length having width and thickness of 40 x 5mm at specified interval.	Sqm							
	Panels are to be seated in each other using two numbers EPDM rubber seating pad per panel. vertical joints should be covered with Geo-textile filter cloth glued to the panel and horizontal joints to be provided with 25 mm dia. polyethylene foam joint filler, 160 mm dia. PVC pipe of 10 Kg./cm2 wrapped with non woven geo textile with perforation of 5mm dia. at staggered intervals of 10 cm c/c etc., complete as per approved drawing and specification including cost of hot dip high adherence strip, legs, geo-textile cloth, EPDM pad, polyethylene foam, joint fillers, tie strips ,fasteners and all accessories, coping beam(if any), drainage layer, drain pipe etc cost of all materials, form work, cost of HYSD reinforcement steel and fabrication design with all lead and lift, loading, unloading, stacking, hire charges of machineries as approved by the Engineer Member.								
	Market Rate								
	for RE walls on the sides					Avg ht			

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	From Kendriya sadana towards Ejipura		2	192.46	--	2.88	1109.21		
	From Ejipura junction towards Domlur		2	118.62	--	2.51	595.47		
	Up Ramp		2	164.75	--	3.65	1202.68		
	Down Ramp		2	169.21	--	3.68	1245.39		
	for RE walls behind abutments		2	17.00	--	7.20	244.80		
			2	6.70	--	6.10	81.74		
							4479.28		
						Say	4480.00	6805.00 6538.00	30486400.00 29290240
[illegible]	KBSRB M2200 - 9. Providing and laying Filter Media with granular meterials / stone crushed aggregates satisfying the requirements laid down in clause 2500.4.2.2. of MoRT&H specifications to a thickness of not less than 600 mm with smaller size towards the soil and bigger size towards the wall and provided over the entire surface behind abutment, wing wall and return wall to the full height compacted to a firm condition complete as per drawing and Technical Specification complete as per specifications MoRT&H Specification No. 710.1.4 of IRC: 78& 2200	Cum							
	(P.No.330, I.No.28.13 of PW,P&IWTD S.R 2012-13)								
	From Kendriya sadana towards Ejipura		2	192.46	0.60	2.29	529.27		
	From Ejipura junction towards Domlur		2	118.62	0.60	1.92	273.30		
	Up Ramp		2	164.75	0.60	3.06	604.96		
	Down Ramp		2	169.21	0.60	3.09	627.43		
							2034.96		
						Say	2035.00	650.16	1323076.00
[illegible]	KBSRB M300.53. Construction of embankment with approved material Gravel / Murrum with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirement Table 300-2 complete as per specifications. (which includes cost of gravel / murrum, watering charges & compaction by vibratory roller)	Cum							
	(P.No.157, I.No.19.60 of PW,P&IWTD S.R 2012-13)								
	From Kendriya sadana towards Ejipura		1	192.46	16.00	2.29	7056.87		
	From Ejipura junction towards Domlur		1	118.62	16.00	1.92	3644.01		
	Up Ramp		1	164.75	5.50	3.06	2772.74		
	Down Ramp		1	169.21	5.50	3.09	2875.72		
							16349.34		
						Say	16350.00	146.88	2401488.00

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
6.10	KSRRB M400-7. Construction of **granular sub-base** by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per Specifications. For Coarse graded granular sub-base material as per 400-2. For Grading I Material	Cum							
	(P.No.165, I.No.20.6.1 of PW,P&IWTD S.R 2012-13)								
	From Kendriya sadana towards Ejipura		1	192.46	16.00	0.20	615.87		
	From Ejipura junction towards Domlur		1	118.62	16.00	0.20	379.58		
	Up Ramp		1	164.75	5.50	0.20	181.23		
	Down Ramp		1	169.21	5.50	0.20	186.13		
							1362.81		
						Say	1363.00	1050.84	1432295.00
6.11	KSSRB M400-17. Providing laying, spreading and compacting graded stone aggregate to **wet mix macadam** specifications including premixing the material with water at OMC in mechanical mix plant carriage of mixed method of tipper to site, laying in uniform layers with paver in sub base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density complete as per specifications. MoRT&H Specification No. 407	Cum							
	(P.No.167, I.No.20.18 PW,P&IWTD S.R 2012-13)								
	From Kendriya sadana towards Ejipura		1	192.46	16.00	0.25	769.84		
	From Ejipura junction towards Domlur		1	118.62	16.00	0.25	474.48		
	Up Ramp		1	164.75	5.50	0.25	226.53		
	Down Ramp		1	169.21	5.50	0.25	232.66		
							1703.52		
						Say	1704.00	1059.18	1805354.00
6.12	KSRRB M500-6. Providing and applying **Primer coat** with bitumen emulsion on prepared surface of granular base including clearing of road surface and spraying primer at the rate of 0.6kg/sqm using mechanical means complete as per specification. MoRT&H Specification No.502	Sqm							
	(P.No.172, I.No.21.6 of PW,P&IWTD S.R 2012-13)								
	From Kendriya sadana towards Ejipura		2	192.46	7.50	--	2886.90		
	From Ejipura junction towards Domlur		2	118.62	7.50	--	1779.30		
	Up Ramp		1	164.75	5.50	--	906.13		
	Down Ramp		1	169.21	5.50	--	930.66		
							6502.98		
						Say	6503.00	42.83	278542.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೆ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
6.13	KSRRB 500-8. Providing and applying **tack coat on granular surface treated with primer** at 3.0 kg per 10 sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of road surface) including cost of all materials, labour,HOM of machineries complete as per specifications. MORT&H Chapter 5	Sqm							
	(P.No.173 I.No.21.8 of PW,P & IWTD SR of 2012-13)								
	From Kendriya sadana towards Ejipura		2	192.46	7.50	--	2886.90		
	From Ejipura junction towards Domlur		2	118.62	7.50	--	1779.30		
	Up Ramp		1	164.75	5.50	--	906.13		
	Down Ramp		1	169.21	5.50	--	930.66		
							6502.98		
						Say	6503.00	20.76	134987.00
6.14	KSRRB 500-11 Providing and laying **bituminous macadam** on prepared surface with crushed coarse aggregates as per design mix formula for base / binding course including loading of aggregaters with F. E. loader, hot mixing of stone aggregates and bitumen in hot mix plant 40 tonne capacity, transporting the mixed material in tipper to paver and laying mixed materials with paver finisher to the required level and grade, rolling by power roller to acheive the deisred density, 50 / 75 mm compacted thickness with 3.3% bitumen but excluding cost of primer / tack coat with lead upto 1km including cost of all materials, labour, HOM of machineries complete as per specifications. MoRT&H Chapter 5 with 60 / 70 grade bitumen	Cum							
	(P.No.173 I.No. 21.11.2 of PW,P&IWTD S.R 2012-13)								
	From Kendriya sadana towards Ejipura		2	192.46	7.50	0.05	144.35		
	From Ejipura junction towards Domlur		2	118.62	7.50	0.05	88.97		
	Up Ramp		1	164.75	5.50	0.05	45.31		
	Down Ramp		1	169.21	5.50	0.05	46.53		
							325.15		
						Say	326.00	6455.69	2104555.00
6.15	KSRRB M500-7 **Providing and applying tack coat on the** prepared black topped surfaces at 2.5kg per 10sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of road surface) including cost of all materials, labour, HOM of machineries complete as per specifications MORTh Chapter 5	Sqm							
	(P.No.173 I.No.21.7 of PW,P & IWTD SR of 2012-13)								
	From Kendriya sadana towards Ejipura		2	192.46	7.50	--	2886.90		
	From Ejipura junction towards Domlur		2	118.62	7.50	--	1779.30		
	Up Ramp		1	164.75	5.50	--	906.13		
	Down Ramp		1	169.21	5.50	--	930.66		
							6502.98		
						Say	6503.00	17.12	111318.00

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
6.16	KSRRB M500-17. Providing and laying **dense graded bituminous macadam** with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder at 4.0 to 4.5% by weight of total mix and filler, transporting the hot mix to work site, laying with hydrostatic paver finisher with sensor control to the required grade, level and alignmnet, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H specification clause No. 500.7 complete in all respects as per specifications. Bitumen 60/70 MoRT&H Specification No. 507	Cum							
	(P.No. 174 I.No.21.19.2 of PW,P&IWTD S.R 2012-13)								
	From Kendriya sadana towards Ejipura		2	192.46	7.50	0.05	144.35		
	From Ejipura junction towards Domlur		2	118.62	7.50	0.05	88.97		
	Up Ramp		1	164.75	5.50	0.05	45.31		
	Down Ramp		1	169.21	5.50	0.05	46.53		
							325.15		
						Say	326.00	9183.46	2993807.00
6.17	KSRRB M500-7 **Providing and applying tack coat on the** prepared black topped surfaces at 2.5kg per 10sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of road surface) including cost of all materials, labour, HOM of machineries complete as per specifications MORTh Chapter 5	Sqm							
	(P.No.173 I.No.21.7 of PW,P & IWTD SR of 2012-13)								
	From Kendriya sadana towards Ejipura		2	192.46	7.50	--	2886.90		
	From Ejipura junction towards Domlur		2	118.62	7.50	--	1779.30		
	Up Ramp		1	164.75	5.50	--	906.13		
	Down Ramp		1	169.21	5.50	--	930.66		
							6502.98		
						Say	6503.00	17.12	111318.00
6.18	KSRRB M500-19. Providing and laying **bituminous concrete 40 mm thick** with 100 - 120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder at 5.4 to 5.6% of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRT&H specification clause No. 500.9 complete in all respects as per specifications. MoRT&H Specification No. 509 with 6% Bitumen 60/70 grade using 40 - 60 HMP	Cum							
	(P.No.176 of I.No.21.22.4 in PW,P&IWTD S.R 2012-13)								
	From Kendriya sadana towards Ejipura		2	192.46	7.50	0.04	115.48		
	From Ejipura junction towards Domlur		2	118.62	7.50	0.04	71.17		

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Up Ramp		1	164.75	5.50	0.04	36.25		
	Down Ramp		1	169.21	5.50	0.04	37.23		
							260.12		
						Say	261.00	11177.44	2917311.00
6.10	KSRRM M2700 -4. Providing fitting and fixing mild steel railing complete as per drawing and technical Specification. Complete as per MoRT&H Specification No. 2703. 1000	m							
	(P.No. 252, I.No. 32.4 of PW, P & IWTD S.R 2012 - 13)								
	From Kendriya sadana towards Ejipura		2	192.46	--	--	384.92		
	From Ejipura junction towards Domlur		2	118.62	--	--	237.24		
	Up Ramp		2	164.75	--	--	329.50		
	Down Ramp		2	169.21	--	--	338.42		
							1290.08	3465.72	4471056.06
6.20	KSRRB M100-4.2. Haulage of materials by tipper including cost of loading, unloading and stacking complete as per specifications. MoRT&H Chapter 1 Case-I : Surface Road	Cum							
	(P. No.141&148 of PW, P&IWTD S.R 2012-13)								
	Qnty same as item no 6.01								
	For 20Km RS. 2.00 X 1.28 X 20 = (52.00 + 68.80)X1.08=122.47								
			1	3010.00			3010.00	122.47	368641.00
6.21	Miscellaneous & Rounding off						₹7358446.06		88554606.06
							₹91553.94		5393.94
						Total Cost of Approaches to be Elevated Corridors			88560000.00

Assistant Executive Engineer
Traffic Engineering Cell,
Bruhath Bangalore Mahanagara Palike
Bangalore - 560 002.

Executive Engineer
Traffic Engineering Cell (Road Infra)
Bruhat Bangalore Mahanagara Palike
Bangalore - 560 002.

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Detailed Cost Estimate

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
7.00	**MEDIAN, KERB & COMPOUND**								
7.01	Providing and fixing Pre cast solid **concrete kerb** stones made out of CC 1:2:4 and finished with CM 1:3 plastering and finishing cutting etc., complete Size 450 x 200 x 400 mm	No.							
	(P.No.28, I.No.5.29.1 of PW,P&IWTD S.R 2012-13)								
	For Road Side Kerb								
	LHS		1	2405.63	--	0.45	5346.00		
	RHS		1	2405.63	--	0.45	5346.00		
	Battery limit								
	Towards Kendriya sadana		2	100.00	--	0.45	444.00		
	Towards Domlur		2	100.00	--	0.45	444.00		
	Towards Hosur Road - Sarjapur Road Juction		2	100.00	--	0.45	444.00		
	Towards Sarjapur Road -Madiwala Road Juction		2	100.00	--	0.45	444.00		
	For Median Kerb								
	Battery limit								
	Towards Kendriya sadana		2	100.00	--	0.45	444.00		
	Towards Domlur		2	100.00	--	0.45	444.00		
	Towards Hosur Road - Sarjapur Road Juction		2	100.00	--	0.45	444.00		
	Towards Sarjapur Road -Madiwala Road Juction		2	100.00	--	0.45	444.00		
	Kerb between Pier below Flyover		2	2405.63	--	0.45	10692.00		
							24936.00		
	Deduct Cross Roads								
	LHS								
	17th Main		1	11.36	--	0.45	25.00		
	7th Cross		1	8.18	--	0.45	18.00		
	4th Cross		1	11.93	--	0.45	27.00		
	Ch-1980		1	5.43	--	0.45	12.00		
	Ch-2019		1	6.07	--	0.45	13.00		
	Ch-2070		1	4.94	--	0.45	11.00		
	Ch-2130		1	2.28	--	0.45	5.00		
	3rd Cross		1	4.61	--	0.45	10.00		
	2nd Cross		1	5.13	--	0.45	11.00		
	1st Cross		1	3.34	--	0.45	7.00		
	4th Cross		1	2.99	--	0.45	7.00		
	Ch-2310		1	4.19	--	0.45	9.00		
	RHS								
	17th Main		1	7.03	--	0.45	16.00		
	Ch-540		1	9.00	--	0.45	20.00		
	Ch-600		1	9.80	--	0.45	22.00		
	Ch-630		1	9.31	--	0.45	21.00		
	Ch 690		1	10.21	--	0.45	23.00		
	Ch-780		1	10.35	--	0.45	23.00		
	Ch-1080		1	9.00	--	0.45	20.00		
	Ch-1530		1	9.90	--	0.45	22.00		
	Ch-1680		1	11.59	--	0.45	26.00		
	Ch-1980		1	4.37	--	0.45	10.00		

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ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Ch-2040		1	6.94	--	0.45	15.00		
	Ch-2130		1	4.24	--	0.45	9.00		
	Ch-2190		1	6.36	--	0.45	14.00		
	Ch-2220		1	4.53	--	0.45	10.00		
	Ch-2250		1	12.38	--	0.45	28.00		
	Obligatory Cross Roads								
	Kendriya sadana Junction		2	40.00	--	0.45	178.00		
	Kormangala BDA Complex		2	30.00	--	0.45	133.00		
	Kormangala 5th Block		2	30.00	--	0.45	133.00		
	Kormangala 60feet Road		2	30.00	--	0.45	133.00		
	Kormangala 8th Main Road Junction		2	30.00	--	0.45	133.00		
	Sony World Junction		2	30.00	--	0.45	133.00		
	At Ch-1950		2	28.15	--	0.45	125.00		
	Ejipura Junction		2	50.00	--	0.45	222.00		
	Down Ramp Cross Roads								
	At Ch-2-150		2	8.78	--	0.45	39.00		
	At Ch-2-203.31		2	8.88	--	0.45	39.00		
	Pier Protection		202	4.30	--	0.45	1980.00		
							3632.00		
							21304.00		
						Say	**21304.00**	289.44	**6166230.00**
	RE- CONSTRUCTION OF COMPOUND								
7.02	KSRB 2 - 2.1: **Earthwork excavation** for foundation of buildings, culverts, water supply, sanitary lines and electrical conduits either in pits or in trenches 1.5m.and above in width, in **ordinary soil** not exceeding 1.5m.in depth including dressing the bottom and sides of pits and trenches, stacking the excavated soil clear from edges of excavation with lead upto 50 m. after breaking of clods complete as per specifications.	Cum							
	(P.No.5, I.No.2.3 of PW,P&IWTD S.R 2012-13)								
	For Compound								
	LHS								
	Ch:100.00 to 450.00		1	350.00	0.90	1.05	330.75		
	Ch:1974.50 to 2012.75		1	38.25	0.90	1.05	36.15		
	Ch:2280.00 to 2670.00		1	390.00	0.90	1.05	368.55		
	Ch:2400.00 to 2670.00		1	270.00	0.90	1.05	255.15		
	RHS								
	Ch:0.00.00 to 450.00		1	450.00	0.90	1.05	425.25		
	Ch:1980.00 to 2130.00		1	150.00	0.90	1.05	141.75		
	Ch:2280.00 to 2700.00		1	420.00	0.90	1.05	396.90		
							1954.50		
						Say	**1955.00**	135.00	**263925.00**
7.03	KSRB 4-1.3: Providing and laying in position **plain cement concrete of mix M7.5** with OPC Cement @180kgs, with 40mm and down size graded granite metal coarse aggregates @ 0.85cum and fine aggregates @0.57cum machine mixed, machine mixed, concrete laid in layers not exceeding 15cms thick, well compacted, in foundation and plinth, including cost of all materials, labour, HOM of machinery, curing complete as per specifications. Specification No. KBS 4.1, 4.2	Cum							
	(P.No.12, I.No.4.3 of PW, P&IWTD S.R 2012-13)								
	For Compound bed								
	LHS								

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	Ch:100.00 to 450.00		1	350.00	0.90	0.15	47.25		
	Ch:1974.50 to 2012.75		1	38.25	0.90	0.15	5.16		
	Ch:2280.00 to 2670.00		1	390.00	0.90	0.15	52.65		
	Ch:2400.00 to 2670.00		1	270.00	0.90	0.15	36.45		
	RHS								
	Ch:0.00.00 to 450.00		1	450.00	0.90	0.15	60.75		
	Ch:1980.00 to 2130.00		1	150.00	0.90	0.15	20.25		
	Ch:2280.00 to 2700.00		1	420.00	0.90	0.15	56.70		
							279.21		
						Say	280.00	3884.76	1087733.00
7.04	KSRB 5.2-3: Providing and Constructing granite / trap / basalt size stone masonry in **foundation with cement mortor 1:6,** stone hammered dressed in courses not less than 20cms high, bond stones at 2m. apart in each course including cost of materials, labour, curing complete as per specifications. Specification No. KBS 5.1.13.	Cum							
	(P.No.25, I.No.5.6 of PW, P&IWTD S.R 2012-13)								
	For compound								
	LHS								
	Ch:100.00 to 450.00		1	350.00	0.75	0.225	59.06		
	Ch:1974.50 to 2012.75		1	38.25	0.75	0.225	6.45		
	Ch:2280.00 to 2670.00		1	390.00	0.75	0.225	65.81		
	Ch:2400.00 to 2670.00		1	270.00	0.75	0.225	45.56		
	RHS								
	Ch:0.00.00 to 450.00		1	450.00	0.75	0.225	75.94		
	Ch:1980.00 to 2130.00		1	150.00	0.75	0.225	25.31		
	Ch:2280.00 to 2700.00		1	420.00	0.75	0.225	70.88		
	2nd footing								
	LHS		1	1048.25	0.60	0.45	283.03		
	RHS		1	1020.00	0.60	0.45	275.40		
	3rd footing								
	LHS		1	1048.25	0.45	0.225	106.14		
	RHS		1	1020.00	0.45	0.225	103.28		
							1116.86		
						Say	**1117.00**	2761.56	**3084663.00**
7.05	KSRB 5.3-3: Providing and Constructing granite / trap / basalt size stone masonry in **basement with cement mortor 1:6,** edges of stones chistle dressed in courses not less than 15cms high, bond stones at 2m. apart in each course including cost of materials, labour, curing complete as per specifications. Specification No. KBS 5.1.13.	Cum							
	(P.No.26, I.No.5.9 of PW, P&IWTD S.R 2012-13)								
	For compound								
	LHS		1	1048.25	0.45	0.45	212.27		
	RHS		1	1020.00	0.45	0.45	206.55		
							418.82		
						Say	**419.00**	3223.80	**1350772.00**

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
7.06	KSRB 4-1.6: Providing and laying in position **plain cement concrete nominal mix M15** with cement @240kgs, with **20mm** and down size graded granite metal coarse aggregates @ 0.878cum and fine aggregates @ 0.459cum, machine mixed, concrete laid in layers not exceeding 15 cms.thick well compacted in foundation, plinth and cills, including cost of all materials, labour, HOM of machinery, curing complete as per specifications. Specification No.KBS 4.1,4.2	Cum							
	(P.No.12, I.No 4.6 of PW, P&IWTD S.R 2012-13)								
	For Plinth at Basement Lvl								
	LHS		1	1048.25	0.45	0.10	47.17		
	RHS		1	1020.00	0.45	0.10	45.90		
	At Top Coping								
	LHS		1	1048.25	0.20	0.10	20.97		
	RHS		1	1020.00	0.20	0.10	20.40		
							134.44		
						Say	**135.00**	4409.64	**595361.00**
7.07	KSRB - 5.14: Providing and Constructing **precast concrete solid blocks** with compressive strength not less than 35 Kg/sqm with cement mortar 1:4 masonry (quoin, Jamb, closer blocks) with solid concrete blocks of size 40x20x20cms conforming to I.S:2185/1965 in superstructure including cost of materials, labour charges, scaffolding, curing complete as per specifications.	Sqm							
	(P.No.27, I.No 5.27 of PW, P&IWTD S.R 2012-13)								
	For compound								
	LHS		1	1048.25	--	2.00	2096.50		
	RHS		1	1020.00	--	2.00	2040.00		
							4136.50		
						Say	**4137.00**	696.60	**2881834.00**
7.08	KSRB 15.1-1: Providing **flush pointing** to square rubble, course or uncoursed stone masonry with **cement mortar 1:3**, 20mm deep, after raking joints to depth of 20mm nicely lining, including cost of materials, labour, curing complete as per specifications.	Sqm							
	(P.No.120, I.No.15.1 of PW, P&IWTD S.R 2012-13)								
	For Basement								
	LHS		1	1048.25	0.45	--	471.71		
	RHS		1	1020.00	0.45	--	459.00		
							930.71		
						Say	**931.00**	71.39	**66462.00**
7.09	KSRB - 15-3.7: Providing 18mm thick **cement plaster** in single coat with **cement mortor 1:6**, to brick masonry including rounding off corners wherever required smooth rendering, providing and removing scaffolding, including cost of materials, labour, curing complete as per specifications.	Sqm							

ದಾಖಲೆಯನ್ನು ಮುಂದಿನ ಉಳ್ಳು ಕಾಮ್ಯ 2005ರ ಅವಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ನಿ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	(P.No.121, I.No.15.17 of PW,P&IWTD S.R 2012-13)								
	LHS		1	1048.25	--	4.25	4455.06		
	RHS		1	1020.00	--	4.25	4335.00		
							8790.06		
						Say	8791.00	147.96	1300716.00
7.10	KSRB 2.3: Filling **available Excavated Earth (excluding rock)** in sides of foundations upto plinth in layers not exceeding 20cms in depth, compacting each deposited layer by raming after watering with lead upto 50m and lift upto 1.5m including cost of all labour complete as per specifications. Specification No.KBS 2.9	Cum.							
	(P.No.6, I.No.2.10 of PW, P&IWTD S.R 2012-13)								
	For foundation								
	Same as Qty of Item No.3.02 - I.No.3.03 & 3.04		--	--	--	--	558.15		
						Say	559.00	90.72	50712.00
7.11	KSRB 15-16.1: Providing and finishing **external walls in two coats with waterproof cement paint** of approved brand and shade to give and even shade after throughly brooming the surface to remove all dirt and loose powdered material, free from mortar drops and other foreign matter cost of materials, labour, complete as per specifications. (with primer)	Sqm							
	(P.No.125, I.No.15.53.2 of PW,P&IWTD S.R 2012-13)								
	LHS		1	1048.25	--	4.25	4455.06		
	RHS		1	1020.00	--	4.25	4335.00		
							8790.06		
						Say	8791.00	66.96	588645.00
									17436993.00
7.12	Miscellaneous and Rounding off								7.00
							Total Cost of Compound, Median and Kerb		17437000.00

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ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Electrical Works

Sl. No.	Description of Work	Unit	Quantity	Rate in Rs.	Amount in Rs.
8.01	Supplying and fixing of Philips make Velocity street light fixtures suitable for 250 Watt metal hallide lamp SGP 338 I x HPI-T250 FG sea green, or equivalent with following parameters Housing made out of LM6 high pressure die cast recyclable aluminium alloy for sturdiness and excellent corrosion resistance the finish should be powder coated sea green housing for improved aesthetics and better environmental protection. The lamp compartment should consist of electrochemicslly anodized, high purity POT reflector with a soecifically designed ribbed profile for better uniformity and high spacing to mounting ratio, All electrical accessories such as energy efficient low loss open construction copper ballast with tw.130 deg., semi parallel ignitor and siemens EPCOS make power pafactor improvement capacitor should be provided prewored upto terminal block. All accessories are to be mounted toa removable gear plate for ease of maintenance. All electrical connections of the control gear module with the rest of the luminarie are click fix, foolproof and require use of no., tools.				
	Control gear compartment opens from top. Heat resistant toughned curved glass bowl for the lamp compartment, which is sealed replacement, is by opening the top compartment to ensure ingress protection of IP66 for the lamp compartment. Flexible optics to achieve optimum light distribution to suit different road and installetion parameter. Specially designed dual pole mounting arrangement bottom as well as lateral pole mounting suitable for mbunting on pole dial., 42mm-70mm luminarie shall fully confirmed to safety norms according to IEC598/ENEC60598 make philips or GE.	Nos.	326.00	12500.00 Rate to get approved	4075000.00
8.02	Fixing metal halide Street light fitting over existing pole / wall ceiling including clamps, bolts, nuts and wiring using suitable capacity wires complete (SR 2010 - 11) Page 28, Item 5.	Nos.	326.00	130.00	42380.00
8.03	Supplying and fixing telescopic M.S.bracket fabricated by using 0.5m length 4" dia telescopic M.S.pipe with 2" dia 1.5m long M.S.bracket all are welded with suitable angle using 6mm thick M.S.sheet, grip bolt & nuts as required suitable for 9 to 12 mtrs M.S.tubular pole or octogonal pole with necessary two coats of approved painting, with all other accessories etc complete				
a)	Double bracket 2 X 1.5 Mtr.Length (SR 2010-11) Page 28, Item 4(c)	Nos.	163.00	1200.00	195600.00
8.04	Fabricating,supplying and erecting sawged tubular pole of height 9Mtr having three sections and providing two coats of red oxide paint and finished with two coats of enamaled paint of approved quality and color and M.S.Base plate of suitable size welded at the bottom of the pole(as per IS)and 40mm dia GI/flexible PVC pipe of 1Mtr. length fitted to the heavy guage polycarbonate control box including 5way connector of size 167x125x82mm for 7.5M pole 200 x 160 x 98 mm for remaining length of pole with front opening cover, with locking arrangements and suitable capacity MCB / DP switch.				

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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Sl. No.	Description of Work	Unit	Quantity	Rate in Rs.	Amount in Rs.
	The pole shall be erected n cement concrete work(1:2:4)including excavation and refilling of planting depth of the pole to the to the ground level and the coping CC shall be upto 0.6M above ground level as per 2713-7				
	C) 10 Mtr (5.2Mtr Hb 139.7mm dia 4.85mm thick x 2.4 Mtr Hm, 114.3mm dia 4.50mm thick x 2 M Ht, 88.9mm dia 3.25mm thick as per IS 410 SP 29 (SR 2010-2011) Page 7, item 21 b	Nos.	163.00	17500.00	2852500.00
8.05	Supply , installation,testing & commissioning of outdoor type feeder piller board with TVM meter as per power distribution schematic diagram enclosed The rates shall include all necessary foundation & civil works (MKT Rate)	Nos.	11.00	80000.00 Rate to be got approved	880000.00
8.06	Supplying, providing, testing and commissioning of 1.1 KV class single core 3/20mm stranded copper cable PVC insulated and sheathed for street lights from the control points located on pole supports at 2.0m above ground level complete and as directed by the Engineer in charge (SR 2010 - 11) Page 9, Item 20(I) (c)	Mtrs	2500.00	25.00	62500.00
8.07	Supplying, providing, testing and commissioning of 50mm GI pipe at pole supports to enclose the UG cable etc., complete and as directed by the Engineer in charge including digging erection etc. (SR 2010 - 11) Page 70, Item 10(b).	Mtrs	652.00	260.00	169520.00
8.08	Fabrication,Supplying and erection of 16Mtrs long polygon high mast of bottom dia 475mm and top dia 150mm with two telescopic sections having bottom piece 8.25Mtrs with 400 thick and top piece 8.25Mtrs with 3mm thick as per BSEN 10025 grade S 355 JO steel sheet plate for shaft suitab le to withstand a wind velocity of 180Km/Hr as per IS 875 part 3 (as per GA drawing).base plate having size 650mm dia 20mm thick with 8 NOS of foundation bolts M24 x 850mm long and connected accessories as per IS 2062.The mast shall be hot dip Galvanised as per BSEN ISO 1461 with an average 70 microns as per IS 2629,and welded as per BS 5135 single L - seam joint.the mast shall have 2 way head frame with 4 nos. of 190mm die cast LM-6 pulleys,stainless steel axils,phosphors bearing bush press fitted with seperate guides for 2 runs of 6mm dia stainless steel wire rope and 5 Core 2.5sqmm EPR insulated PCP sheathed trailing power cable all are housed iside the bottom shaft of mast with suitable locking 275x1000mm hinged door.The mast shall have power tool having 1.0HP, 415V, 50 Hz, 3 phases reversible				
	960 rpm geared motor mast.The mast shall have lantern of 2 segments,2370mm dia with max load of 350Kgs carrying capacity as per IS 1239.The mast shall be errected on existing 1700mm depth of shallow shaft RCC footing.The mast shall be supplied with 3mm thick template,lightning arrestor of 1.2m lenght galvanised pipe with top arrow will be fitted at top of the head frame cover and GLS type aviation twin lamps fitting with wiring complete.(weight of th emast with accessories approximately 734Kgs) (SR 2010 - 11) Page 77, Item 27				
	(SR 2010-11) Page 77, Item no. 27(1) .				
a)	Group A	Each	4.00	192000.00	768000.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋಜನೆ-ಕೇ-2, ಬಿ.ಬಿ.ಸಿ.ಎಲ್

Sl. No.	Description of Work	Unit	Quantity	Rate in Rs.	Amount in Rs.
8.09	Suppling high preesure 2 x 400 Watts Metal halide flood light luminary suitable for use with high pressure metal halide lamp with integrated control gear.The fitting shall be non corrosive high pressure die cast aluminium housing with toughened glass, low copper content black/grey powder coated paint finish including wiring,suitable to operate on 230/250Volts 50Hz supplied with 2 x 400 Watts HP metal halide lamps.(SR 2010 - 11) Page 20, Item 14.VI.				
a)	Group A	Each	32.00	18700.00	598400.00
8.10	Fixing halogen/metal halide/SVL/IL flood light fitting over existing pole/wall/ceiling including clamps,bolts,nuts and wiring using suitable capacity wires complete.(SR 2010 - 11) Page 28, Item 5.	Each	64.00	130.00	8320.00
8.11	**Supplying of L.T. Cables**				
	Supplying of L.T.UG cable having aluminium conductor PVC insulated sheathed, galvanised, steel wire/steel tape armoured cable with PVC outer sheathing 1.1 KV class (conforming to IS 1554)				
a)	3.5C x 50 Sqmm XLPE cable (SR 2010-11) page 69, Item 4(I)(g)	Mtrs.	2500.00	340.00	850000.00
b)	4C x 16 Sqmm XLPE cable (SR 2010-11) page 69, Item 4(I)(d)	Mtrs.	15000.00	150.00	2250000.00
8.12	**Laying of L.T. Underground cables**				
	Labour charges for laying of 1.1 KV class UG cable when supplied departmentally / agency in existing trench GI pipe / stoneware pipe / on wall / on pole as required				
a)	3.5C x 50 Sqmm XLPE cable (SR 2010-11) page 69, Item 5(I)(b)	Mtrs.	2500.00	11.00	27500.00
b)	4 C x 16 Sqmm XLPE cable (SR 2010-11) page 69, Item 5(I)(a)	Mtrs.	15000.00	8.00	120000.00
8.13	**End Termination of above cables with glands crimping type copper sockets.**				
a)	3.5C x 50 Sqmm XLPE cable (SR2010-2011) Page 71 item 13(d) & page 74 item 20(i) (g) (114 + 3.5×50) = 319.00	Nos.	100.00	319.00	31900.00
b)	4C x 16 Sqmm XLPE cable (SR2010-2011) Page 70 , item 11 (a) & 74 item 20(f) (56 + 4×14) = 112.00	Nos.	600.00	112.00	67200.00
8.14	Supplying and fixing L.T.cast iron pot heads suitable for 1.1KV class UG Cable filled with necessary bitumen / insulating compound with terminals, clamps, bolts, nut and washers etc.,				
a)	50 sqmm (SR 2010-11) page 70, Item 10(e)	Nos.	34.00	413.00	14042.00
8.15	Digging of trench of 0.6 mtr deep x 0.50 mtr wide refilling the ternch to the required ground level and consolidating etc., complete (as per civil SR KSRB 1-2, P-7)				
a)	In soil(hard)	Rmtr	5000.00	50.00	250000.00

Sl. No.	Description of Work	Unit	Quantity	Rate in Rs.	Amount in Rs.
	(SR 2010 - 11) Page 70, Item 6(b)				
8.16	**EARTHING**				
8.17	Supplying fixing, wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40mm dia 2.90 thick GI pipe 2.5 mtr long buried in a pit ... The pit should be filled with equal proportion of salt and charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as oer ISI specification 7.3.3. of IS 732 using 12mm dia bolts, nuts, washers and checknuts etc, the pipe shall have 16 through holes of 12.2mm dia. (SR 2010-11) page-68,and item-2	Nos.	12.00	3000.00	36000.00
8.18	Supply & laying following GI Flat / Wires as Earthing conductors from equipment to earth stations.				
a)	25 x 6mm G.I.Flat (SR 2010-11)Page 68 and item 3 (a)	Mtrs.	1136.00	75.00	85200.00
b)	8 SWG G.I Wire (SR 2010-11) Page-75, item 23.I.(c)	Mtrs.	5000.00	20.00	100000.00
8.19	**Miscellaneous**				
8.20	Supplying & laying of RCC Hume pipe of 150 mm dia.	Mtrs.	835.00	495.00	413325.00
					13897387.00
	Add Contengencies @ 3%				416921.61
					14314308.61
8.21	Miscellaneous & Rounding off				85691.39
				Total Amount in Rs.	14400000.00

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BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Detailed Cost Estimate

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
9.00	**ROAD FURNITURE & OTHER WORKS**								
9.01	KSRS M800 - 13. **Road Marking** with Hot Applied Thermoplastic Compound with Reflectrising Glass Beads on Bituminous Surface: - Providing and laying of hot applied thermoplastic compound 2.5 mm thick including reflectorising glass beads at 250 gms per sqm area, thickness of 2.5mm is exclusive of surface applied glass beads as per IRC:35. The finished surface to be level, uniform and free from streaks and holes complete as per specifications. MoRT&H Specification No. 803.	Sqm							
	(P.No.194, I.No.24.15 of PW,P&IWTD 2012-13)								
	On Flyover with Approach&Battery limit								
(a)	Centre Lane Marking line		2	1305.00	0.15	--	391.50		
(b)	Edge line		4	2610.00	0.15	--	1566.00		
(c)	Directional arrows		10	5.00	0.90	--	45.00		
	Up Ramp								
(d)	Edge line		2	165.00	0.15	--	49.50		
(e)	Directional arrows		4	2.00	0.90	--	7.20		
	Down Ramp								
(f)	Edge line		2	170.00	0.15	--	51.00		
(g)	Directional arrows		4	2.00	0.90	--	7.20		
	On Surface								
(a)	Centre Lane Marking line(Both sides)		2	2210.01	0.15	--	663.00		
(b)	Edge line								
	LHS		2	2210.01	0.15	--	663.00		
	RHS		2	2210.01	0.15	--	663.00		
	Below Flyover								
	Towrads Kendriya Sadana upto Ramp End		1	282.00	0.15	--	42.30		
	Towrads Domlur upto Ramp End		1	360.00	0.15	--	54.00		
	Below Viaduct		**2**	**627.00**	**0.15**	--	188.10		
(c)	Paved Pedestrain crossings								
	Kendriya Sadana Junction		70	3.00	0.50	--	105.00		
	Koramangala BDA Complex Junction		45	3.00	0.50	--	67.50		
	Koramangala 5th Block Junction		27	3.00	0.50	--	40.50		
	Koramangala 60 feet Road Junction		27	3.00	0.50	--	40.50		
	Koramangala 8th Main Junction		33	3.00	0.50	--	49.50		
	Sony world Junction		42	3.00	0.50	--	63.00		
	Ejipura Junction		39	3.00	0.50	--	58.50		
(d)	Directional arrows		18	5.00	0.90	--	81.00		
							4896.31		
						Say	4897.00	429.84	2104926.00
9.02	No.KRBS 800.1.**Painting two coats after** filling the surface with synthetic enamel paint in approved shades on new plastered **concrete surfaces, with materials, labour** complete as per specifications. Specification MoRT&H Chapter 8	Sqm							

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	(P.No.192, I.No.24.1 of PW,P&IWTD S.R 2012-13)								
	For Kerb Painting								
	For Road Side Kerb and Median		21304.00	0.45		0.35	3355.38		
	For Pier Protection		101	12.50		1.45	1830.63		
							5186.01		
						Say	5187.00	46.76	242565.00
9.03	Road Delinators								
	Supplying and Installation of delineators (road way indicators, hazard markers, object markers), 80 - 100 cm high above ground level, painted black and white in 15 cm wide strips, fitted with 80 x 100 mm rectangular or 75 mm dia circular reflectorised panels at the top, buried or pressed into the ground and conforming to IRC - 79 and the drawings complete as per specifications. MoRT&H Specification No. 805.	Each							
	(P.No.195, I.No.24.19 of PW,P&IWTD SR 2012-13)								
	For Every 5m interval								
	On Flyover		522	--	--	--	522		
	On Surface Road		442.002	--	--	--	442		
							964	363.96	350858.00
9.04	Retro Reflectorised Traffic Signs								
	Providing and fixing of Retro-reflecterised cautionary, mandatory, informatory sign as per IRC:67 made of high intensity grade sheeting vide clause 800.1.3, fixed over Aluminium sheeting, 1.5 mm thick supported on a mild steel angle iron post 75mm x 75mm x 6mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45cm x 45cm x 60cm, 60cm below ground level as per approved drawing complete as per specifications. MoRT&H Specification								
	(P.No.192, I.No.24.2 of PW,P&IWTD SR 2012-13)								
(i)	60cm circular								
a)	No parking board	Each	52	--	--	--	52.00		
b)	Speed limit board	Each	52	--	--	--	52.00		
c)	Compulsary ahead or left turn	Each	52	--	--	--	52.00		
d)	Overtaking prohibited board	Each	52	--	--	--	52.00		
e)	No stopping sign board	Each	52	--	--	--	52.00		
							260.00	2933.28	762653.00
(ii)	90cm equilateral triangle								
a)	Pedestrian crossing sign boards	Each	28	--	--	--	28.00		
b)	No Pedestrian crossing sign boards	Each	7	--	--	--	7.00		
							35.00	3418.20	119637.00
(iii)	Informatory sign boards								
(a)	90cm high octagon	Each	25	--	--	--	25.00	4310.28	107757.00

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ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ವೆ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
9.05	KSRRB M800 - 20. Tubular Steel Railing on Medium Weight Steel Channel (ISMC Series) 100 mm x 50mm: - Providing, fixing and erecting 50 mm dia steel pipe railing in 3 rows duly painted on medium weight steel channels (ISMC series) 100 mm x 50mm, 1.2 metres high above ground, 2 m centre to centre, complete as per approved drawings as per specifications. MoRT&H Specification No. 808.	m							
	(P.No.195&196, I.No.24.24 of PW,P&IWTD SR 2012-13)								
	For Footpath and between Pier below Flyover		1	9586.80	--	--	9586.80		
							9586.80	1524.96	14619487.00
9.06	**KSRRB M800 Road Markers / Road stud** KSRRB M800 - 35. Providing and fixing of road stud 100 x 100 mm, die cast in aluminium, resistant to corrosive effect of salt and grit, fitted with lense reflectors, installed in concrete or asphlatic surface by drilling hole 30 mm upto a depth of 60mm and bedded in a suitable bituminous grout or epoxy mortar, all as per BS: 873 part 4: 1973 complete as per specifications.	Nos.							
	(P.No.198, I.No.24.41 of PW,P&IWTD SR 2012-13)								
	Spaced at Five meter interval								
	For Every 5m Interval								
	L=2610 X 6 = 15660m								
	No's =2610/5 = 1230*6 Rows	6	522	--	--	--	3132		
	on Surface								
	L=2210*4=8840m								
	No's = 2210/5 = 976*6 Rows	6	976	--	--	--	5856		
							8988	289.44	2601487.00
9.07	**KSSRBM800 - Flagman** KSSRRB M800 - 46. Positioning of a smart flagman with a yellow vest and a yellow cap and a red flag 600 x 600 mm securely fastened to a staff 1 m in length for guiding the traffic complete as per specifications.	Each							
	(P.No.200, I.No.24.49 of PW,P&IWTD 2012-13)								
	Considering 5 Nos. per day for a period of 30months		4500	--	--	--	4500.00	263.52	1185840.00
9.08	Providing Over head Gantry	As per Sub estimate		2.00			2.00	1783000.00	3566000.00
9.09	Providing Cantilever Gantry	As per Sub estimate		4.00			4.00	276000.00	1104000.00
									26765210.00
9.10	Miscellaneous and Rounding off								4790.00
							Total Cost of Road Furniture Works		26770000.00

Assistant Executive Engineer
Traffic Engineering Cell,
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Executive Engineer
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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

BRUHAT BANGALORE MAHANAGARA PALIKE

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Over Head & Cantilever Gantry Detailed Estimation

Sl. No.	Description of work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
	OVER HEAD GANTRY OF SPAN 30M								
1	KSRRB M2100-2.1 **Earthwork in excavation for foundation of structures** as per drawing and technical specifications, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material complete as per specifications, **B.Mechanical Means (i) Depth upto 3m** MORTH Specification No.304	Cum							
	Add 10% extra for dewatering charges								
	(P.No.220, I.No.27.4 of PW, P&IWTD SR 2012-13)								
	Gantry		3	3.90	3.90	1.80	82.13		
						Say	82.50	44.37	3661.0
2	KSRRB M2100-13 **Plain cement concrete M15** with OPC cement @240kgs with 40mm and down size graded granite metal coarse aggregates @ 0.84cum and fine aggregates @0.56cum in open foundation complete as per Drawing and Technical Specifications **A.PCC Grade M-15** MORTH Specification No. 1500, 1700 & 2100	Cum							
	(P.No.223, I.No.27.24 of PW, P&IWTD SR 2012-13)								
	Gantry		3	3.90	3.90	0.10	4.56		
						Say	5.00	3892.32	19462.0
3	KSRRB M2100-14 **Reinforced cement concrete M20** with OPC cement @300kgs, with 40mm and down size graded granite metal coarse aggregates @0.64cum and fine aggregates @ 0.43cum, with superplastisiser @3lts conforming to IS9103-1999 Reaffirmed-2008, in Open foundation complete as per Drawing and Technical Specifications MORTH Specification No.1500,1700 & 2100	Cum							
	(P.No.223, I.No.27.25 of PW, P&IWTD SR 2012-13)								
	Column footing		2	3.70	3.70	0.60	16.43		
						Say	16.50	4617.00	76181.0
4	KSRRB M220-5.9 Design mix M20 with OPC cement @320kgs, with 20mm and down size graded granite metal coarse aggregates @0.69cum and fine aggregates @ 0.46cum, with superplastisiser @3lts conforming to IS9103:1999 Reaffirmed-2008. RCC Grade M-20 - i) upto 5m height.	Cum							
	(P.No.228, I.No.28.7.9 of PW, P&IWTD SR 2012-13)								
	Column upto GL		2	2.50	2.50	1.10	13.75		

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂ
ಯೋ-ಕೆ-೨, ಬಿ.ಬಿ.ಎ

Sl. No.	Description of work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
						Say	14.00	5176.44	72470.0
5	KSRRB M2200-6 Supplying, fitting and placing **TMT bar reinforcement in sub-structure** complete as per drawing and Technical specifications complete as per specifications MORTH Specification No.1600 & 2200	MT							
	(P.No.230, I.No.28.8 of PW, P& IWTD SR 2012-13)								
	Gantry								
	Mat Reinforcement					Unit Wt/Rmt			
	Main bar 25 nos 12mm dia	3	25	4.40	--	0.89	293.70		
	Distribution bar 25 nos 12mm dia	3	25	4.40	--	0.89	293.70		
	Column pedestal								
	Main bar 16 nos 16mm dia	3	16	4.50	--	1.58	341.28		
	Stirrups 8mm dia bar 200mm c/c								
	Vertical	3	27	7.40	--	0.394	236.16		
	Horizontal	3	9	7.40	--	0.394	78.72		
	Diagonal	3	9	6.70	--	0.394	71.27		
						Sub Total	1314.84	Kgs	
	Add 5% for Wastage						65.74		
						Total	1380.58	Kgs	
						Qty in MT	1.38	68178.24	94126.1
6	Supplying, fabricating, erecting, and fixing in position, inserts and embedments, Truss, clamps, brackets, insert plates and all miscellaneous steel works as shown in drawing and as directed by the Engineer at all depths, using MS angles, channels, steel beams, rails, tees, plates, flats, rounds squares etc., of various sizes and other structural section confirming IS 2062 grade A, medium class GI pipes etc., including straighting, cutting, fabricating, welding, bending to slope fixing to position, welding to insert plate embeded in concrete and inclusive of 2coats of enamel paint over one coat of metal primer. The rate quoted is to include the cost of all materials, labour, tools, tackets, cranes, devices and plants, wastage etc., as per specifications and drawings complete. Including cost of bolts, nuts, washers, clamps, welding, electrodes, and connections required for the work. Rate to include shims and packing peices etc., complete with all lead and lifts as directed by the Engineer-in-charge.	MT							
	(Data Rate)								
	Gantry								
	Structural steel on pedestal					Unit Wt/Rmt			
	M S Base plate 20mm thick								
	3x2.5mx2.5mx0.02mx7850kg/cum = 2943.75		--	--	--	--	2943.75		
	Anchor bolt 25mm dia 16 nos 3.42 kg/No		3	16.00	--	3.42	164.16		
	Stiffner plate 12mm thick 4 nos per each pedestal								
	Vertical Plate								
	3x4X2.3mx0.4mx0.012mx7850kg/cum =		--	--	--	--	1039.97		
	Stiffners								
	3x16X0.1mx0.3mx0.012mx7850kg/cum =		--	--	--	--	135.65		
	Vertical structural sections								
	ISA 100x100x8mm @ 12.1kg/m	3	4	8.69	--	12.10	1261.79		

Sl. No.	Description of work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount i Rs.
	Horizontals								
	ISA 65x65x6mm @5.8kg/m	3	16	2.00	--	5.80	556.80		
	Diagonal sections								
	ISA 75x75x6mm @ 6.8kg/m	3	20	2.65	--	6.80	1081.20		
	Horizontal structural sections								
	ISA 75x75x6mm @ 6.8kg/m	1	2	34.00	--	6.80	462.40		
	ISMC 125x65x65mm @13:1kg/m	1	2	34.00	--	13.10	890.80		
	Vertical								
	ISA 65x65x6mm @5.8kg/m	2	17	1.00	--	5.80	197.20		
	Horizontal								
	ISA 65x65x6mm @5.8kg/m	2	17	2.00	--	5.80	394.40		
	Diagonal sections								
	Front & Back	2	34	2.24	--	6.80	1035.78		
	Botom & Top	2	34	2.24	--	6.80	1035.78		
	Covering of truss								
	Ms Plate 5mm thick @ 39.2 kg/Sqm								
	Top	1	34	2.00	--	39.20	2665.60		
	Gusset Plate								
	A-type Vertical Joint								
	3x20X0.3mx0.4mx0.008mx7850kg/cum =		--	--	--	--	452.16		
	B-type Top Horizontal Joint								
	2x7X0.15mx0.15mx0.008mx7850 kg/cum =		--	--	--	--	19.78		
	C-type								
	2x3X0.30mx0.30mx0.008mx7850 kg/cum =		--	--	--	--	33.91		
	Sides								
	2x17X0.30mx0.30mx0.008mx7850kg/cum =		--	--	--	--	197.17		
						Total	14568.29	Kgs	
						Qty in MT	14.57		
						Say	14.60	72000.00	1051200.0
7	KSRRBM800-5.2. Providing and Erecting overhead signs with a corrosion resistant 2mm thick aluminium alloy sheet reflectorised with high intensity retro-reflective sheeting of encapsulated lense type with vertical & lateral clearance given in clause 800.2.2 and 800.2.3 and installed as per cluse 800.2.7 over a designed support system of aluminium alloy or galvanised steel trestles and trusses of sections and type as per structural design requirements and approved plans complete as per specifications. B.Aluminium Alloy Plate for Over Head Sign MORTH Specification No. 802	Sqm							
	(P.No.193, I.No.24.6 of PW,P&IWTD SR 2012-13)								
	Covering of truss								
	Top		2	34.00	--	1.00	68.00		
							68.00	6534.00	444312.00
8	KSRB 15.18.1: **Applying red lead ready mix priming coat over new steel or other metal surface** including preparing tho surface after throughly cleaning oil, grease, dirt and othe foreign matter, and scoured with wire brushes, fine steel wool, sand papers including cost of materials, labour, complete as per specifications.	Sqm							

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

Sl. No.	Description of work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount i Rs.
	(P.No.128, I.No.15.73 of PW,P&IWTD SR 2012-13)								
	Gantry		12	2.00	--	8.70	208.80		
	Top Truss		2	30.00	--	1.00	60.00		
			2	30.00	--	2.00	120.00		
	Covering Truss								
	Ms Plate 5mm thick @ 39.2 kg/Sqm		1	30.00	--	2.00	60.00		
							448.80	22.68	10179.0
9	**KSRB 15.18.2: Providing and applying enamel metal paint** two coats (Excluding priming coat) over new steel or other metal surface brushing to give an even shade after cleaning oil, grease, dirt and other foreign matter, including cost of materails, labour, complete as per specifications.	Sqm							
	(P.No.128, I.No.15.74 of PW,P&IWTD SR 2012-13)								
	Quantity same as Primer Coat		--	--	--	--	68.00	74.52	5067.0
10	KSRB 2.4: **Refilling available excavated earth** around pipe lines, cables in layers not exceeding 20cms in depth, compacting earth deposited layer by ramming after watering with lead upto 50m and lift upto 1.5m including cost of all labour complete as per specfiications.	Cum							
	(P.No.6, I.No.2.11 of PW,P&IWTD SR 2012-13)								
			--	--	--	--	61.00	54.00	3294.0
11	KSRRB M100-4.1: **Cost of Haulage including loading and unloading** of stone Boulder / Stone aggregates / Sand /Kankar / Moorum KSRRB M100-1: Placing tipper at loading point, loading with front end loader, dumping, turning for return trip, excluding time for haulage and return trip complete as per specifications. MORTH Chapter 1	Cum							
	conveying up to 20km by mechanical means.								
	(P.No.142&148 of PW,P&IWTD S.R 2012-13)			--	--	--	21.50	122.47	2633.0
	For 20Km Rs. 2.00 X 1.28 X 20 = (52.00 + 62.20)X1.08=122.47								
									1782585.0
12	Miscellaneous and Rounding off								415.0
						Total Cost of Over head Gantry			1783000.0
	CANTILEVER GANTRY								
1	**KSRRB M2100-2.1 Earthwork in excavation for foundation of structures** as per drawing and technical specifications, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom and backfilling with approved material complete as per specifications, **B.Mechanical Means (i) Depth upto 3m** MORTH Specification No.304	Cum							
	Add 10% extra for dewatering charges								
	(P.No.221, I.No.27.4 of PW, P&IWTD SR 2012-13)								
	Cantilever Gantry		1	2.15	2.15	1.50	6.93		
						Say	7.00	44.37	311.00

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2
ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ
ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

Sl. No.	Description of work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
2	KSRRB M2100-13 **Plain cement concrete M15** with OPC cement @240kgs with 40mm and down size graded granite metal coarse aggregates @ 0.84cum and fine aggregates @0.56cum in open foundation complete as per Drawing and Technical Specifications **A.PCC Grade M-15** MORTH Specification No. 1500, 1700 & 2100	Cum							
	(P.No.223, I.No.27.24 of PW, P&IWTD SR 2012-13)								
	Cantilever Gantry		1	2.15	2.15	0.10	0.46		
						Say	0.50	3892.32	1946.0
3	KSRRB M2100-14 **Reinforced cement concrete M20** with OPC cement @300kgs, with 40mm and down size graded granite metal coarse aggregates @0.64cum and fine aggregates @ 0.43cum, with superplastisiser @3lts conforming to IS9103-1999 Reaffirmed-2008, in Open foundation complete as per Drawing and Technical Specifications MORTH Specification No.1500,1700 & 2100	Cum							
	(P.No.223, I.No.27.25 of PW, P&IWTD SR 2012-13)								
	Column footing		1	1.95	1.95	0.40	1.52		
						Say	2.00	4617.00	9234.0
4	KSRRB M220-5.9 Design mix M20 with OPC cement @320kgs, with 20mm and down size graded granite metal coarse aggregates @0.69cum and fine aggregates @ 0.46cum, with superplastisiser @3lts conforming to IS9103-1999 Reaffirmed-2008. **RCC Grade M-20 - i) upto 5m height.**	Cum							
	(P.No.228, I.No.28.7.9 of PW, P&IWTD SR 2012-13)								
	Column upto GL		1	0.60	0.60	1.00	0.36		
						Say	0.50	5176.44	2588.0
5	KSRRB M2200-6 Supplying, fitting and placing **TMT bar reinforcement in sub-structure** complete as per drawing and Technical specifications complete as per specifications MORTH Specification No.1600 & 2200	MT							
	(P.No.230, I.No.28.8 of PW, P& IWTD SR 2012-13)								
	Mat Reinforcement								
	Main bar 10 nos 10mm dia bar		10	2.40	--	--	24.00		
	10x2.4 = 24.00 x 0.62kg/m						14.88	Kgs	
	Distribution bar 10 nos 10mm dia bar		10	2.40	--	--	24.00		
	10x2.4 = 24.00x 0.62kg/m						14.88	Kgs	
	Column pedestal								
	Main bar 4 nos 16mmdia bar		4	2.60	--	--	10.40		
	4x2.6 = 10.40 x 1.57kg/m						16.33	Kgs	
	Main bar 4 nos 12mmdia bar		4	2.60	--	--	10.40		
	4x2.6 = 10.40 x 0.89kg/m						9.26	Kgs	
	Stirrups 10 nos 8mm dia bar		10	2.50	--	--	25.00		
	10x2.5 = 25.00 x 0.39kg/m						9.75	Kgs	
						ಮಾಪಿಲೆಯಷ್ಟು ಮುಂದಿನ ಪುಟಕ್ಕೆ Total	2006	5.09 Kgs	
						ಅಂಯಲ್ಲಿ Qty in MT	0.07	68178.24	4438.00

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

Sl. No.	Description of work	Unit	No.	Length m	Breadth m	Depth m	Quantity	Rate in Rs.	Amount in Rs.
6	Supplying, fabricating, erecting, and fixing in position, inserts and embedments, Truss, clamps, brackets, insert plates and all miscellaneous steel works as shown in drawing and as directed by the Engineer at all depths, using MS angles, channels, steel beams, rails, tees, plates, flats, rounds squares etc., of various sizes and other structural section confirming IS 2062 grade A, medium class GI pipes etc., including straighting, cutting, fabricating, welding, bending to slope fixing to position, welding to insert plate embeded in concrete and inclusive of 2coats of enamel paint over one coat of metal primer. The rate quoted is to include the cost of all materials, labour, tools, tackets, cranes, devices and plants, wastage etc., as per specifications and drawings complete. Including cost of bolts, nuts, washers, clamps, welding, electrodes, and connections required for the work. Rate to include shims and packing peices etc., complete with all lead and lifts as directed by the Engineer-in-charge.	MT							
	(Data rate)								
	M S Base plate 16mm thick								
	0.6mx0.6mx0.016mx7850kg/cum = 45.22 kgs			--	--	--	45.22	Kgs	
	Anchor Bolt 25mm bolt 750mm long 8nos		8	0.75	--	--	6.00		
							20.52	Kgs	
	Stiffner plate 12mm thick 4 nos								
	4x0.3mx0.15mx0.012mx7850kg/cum		--	--	--	--	16.96	Kgs	
	NB 300 @ 45Kg/m		1	6.00	--	--	6.00		
							270.00	Kgs	
	Base Plate 12mm above NB 300								
	2x0.85mx0.85mx0.012mx7850kg/cum = 45.22 kgs			--	--	--	136.12	Kgs	
	Stiffner plate								
	4x0.3mx0.15mx0.012mx7850kg/cum		--	--	--	--	16.96	Kgs	
	NB 80 @ 49.5Kg/m								
	Horizontal		4	4.30	--	--	17.20		
	Top & Bottom		10	0.75	--	--	7.50		
	Diagonal		8	2.05	--	--	16.40		
							41.10		
							2034.45	Kgs	
	NB 50 @ 5.1Kg/m								
	Vertical		10	1.80	--	--	18.00		
							91.80	Kgs	
	NB 100 @ 12.1Kg/m								
	Cantilever Supporting Bar		2	1.00	--	--	2.00		
							24.20	Kgs	
	Covering of Truss								
	MS Plate 5mm thick @ 39.2kg/sqm		2	4.30	--	2.00	17.20		
							674.24	Kgs	
						Total	3330.46	Kgs	
						Qty in MT	3.33		
						Say	3.50	72000.00	252000.0

ಪಾವತಿಯನ್ನು ಮಾಡಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು

Sl. No.	Description of Work	Unit	SR Page No.	Item No.	Basic Rate in Rs.	AW 8%	Total Rate in Rs.
	Add 10% extra for Dewatering		225	Note1	7.50		
				Total	82.45	6.60	89.04
83	KSRRB M2100 - 17.1. Plain / Reinforced Cement Concrete **design mix M25** with OPC cement @340kgs	Cum	224	27.30	4747.00	379.76	5126.76
84	Providing, casting, erection and assembling of 180 mm thick pre-cast RCC facia panel of M35 grade	Sqm	Data Rate				6805.00 6538.00
85	KSRRB M800- Portable **barricade in Construction Zone**	Each	199	24.44	2866.00	229.28	3095.28
86	Supplying, fabricating, erecting, and fixing in position, inserts and embedments, Truss	MT	Data Rate		52000.00	-	52000.00
	Fabrication Charges				20000.00		20000.00
							72000.00
87	Providing and fixing **Project Display Board** of Size 1.80 vertical x 1.60 mtrs. Horizontal made of cold rolled coil 16 Guage	Nos.	81	8.47 (NHSR 09-10)	7510.00	450.60	7960.60
88	KSRRB M2700-9. Providing, precasting, transportation and placing in position **precast post tensioned concrete girders** as per drawing and technical specifications complete as per specifications. MoRT&H Specification No.1800 & 2300	Cum	253.00	32.9	19119.00	1529.52	20648.52
89	KSRRB M500-7 **Providing and applying tack coat on the** prepared black topped surfaces at 2.5kg per 10sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of road surface) including cost of all materials, labour, HOM of machineries complete as per specifications MORTh Chapter 5	Sqm	173.00	21.70	15.85	1.27	17.12
90	KSRRB 3000 **Filling Pot - holes and Patch Repairs with Bituminous Concrete, 40mm** KSRRB M3000-5: Removal of all field material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation as per clause 500.3, back filling the pot holes with hot bituminous material as per clause 500.4, compacting, trimming and finishing the surface to form a smooth continuous surface, all as per clause 3004.2 complete as per specifications MoRT&H Specification No. 3004.2	Sqm	262.00	35.50	366.50	29.32	395.82
91	KSRRB 300-50. Scarifying bituminous course 50mm to 75mm thick along with premix carpet / surface dressing by road roller attached with scarifier without disturbing the base and stacking the debris within a lead of 100 metres including cost of all labour charges, HOM of machineries complete as per specifications.MORT&H Chapter 3	Sqm	156.00	19.56	22.00	1.76	23.76

ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005
ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Sl. No.	Description of Work	Unit	SR Page No.	Item No.	Basic Rate in Rs.	AW 8%	Total Rate in Rs.
92	KSRB 14.6-1. Providing and laying heavy duty cobble stones 75mm thick interlock pavers, using cement and course sand for manufacture of blocks of approved size, shape and colour with a minimum compressive strength of 281 kg per sqm over 50mm thick sand bed (average thickness) and compacting with plate vibrator having 3 tons compaction force thereby forcing part of sand underneath to come up in between joints, final compaction of paver surface joints into its final level, including cost of materials, labour and HOM of machineries complete as per specification. Specification No. KRS	Sqm	109.00	14.70	707.00	56.56	763.56

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ದಾಖಲೆಯನ್ನು ಮಾಹಿತಿ ಹಕ್ಕು ಕಾಯ್ದೆ 2005ರ ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಟಿಯೋ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Data Rate for Providing, Casting, Erection and Assembling of 180 mm thick Pre-Cast RCC Facia Panel

Sl. No.	Description	Unit	Quantity	Rate In Rs.	Amount in Rs
1	**Providing, casting, erection and assembling of 180 mm thick pre-cast RCC facia panel of M35 grade** aesthetically finished cruciform shape mechanically stabilized reinforced earth wall to the required line, grade and cross sections with hot dip high adherence strips and panel lugs of required length having width and thickness of 40 x 5mm at specified interval. Panels are to be seated in each other using two numbers EPDM rubber seating pad per panel. vertical joints should be covered with Geo-textile filter cloth glued to the panel and horizontal joints to be provided with 25 mm dia. Polyethylene foam joint filler, 160 mm dia. PVC pipe of 10 Kg./cm^2 wrapped with non woven geo textile with perforation of 5mm dia. at staggered intervals of 10 cm c/c etc., complete as per approved drawing and specification including cost of hot dip high adherence strip, legs, geo-textile cloth, EPDM pad, polyethylene foam, joint fillers, tie strips, fasteners and all accessories, coping beam (if any), drainage layer, drain pipe etc cost of all materials, form work, cost of HYSD reinforcement steel				
	and fabrication design with all lead and lift, loading, unloading, stacking, hire charges of machineries as approved by the Engineer in charge as directed by the Engineer in charge.				
	Unit = 1Sqm				
a	As per Quotation from Reinforced Earth India Pvt., Ltd. (Quotation enclosed)	Sqm	1.00	4850.00	4850.00
b	Statuary Levies & applicable Taxes @ 15%				727.50
				Sub total A	5577.50
c	Add for Over Heads & Contigencies @ 12%				669.30
d	Add for Contractor Profit @10%				557.75
				Sub total B	6804.55
	Cost per Sqm			Say	6805.00

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ಅಡಿಯಲ್ಲಿ ನೀಡಲಾಗಿದೆ

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

DATA RATE FOR THE PRECAST SLAB 100MM THICK

Ref: As per PW, P&IWTD SR 2012 - 13

Consider-10Sqm (Slab Size-0.90x0.60*2=1.0 Sqm)

Sl. No.	Description of work	Unit	No.	Length m	Breadth m	Depth m	Total Quantity	Rate in Rs.	Amount in Rs.
1	KSRRB M2200-6. **Supplying, fitting and placing TMT bar** reinforcement in sub-structure complete as per drawing and Technical Specifications complete as per specifications**MORT&H** Specification No.1600 & 2200	MT							
	(P.No.230, I.No.28.8 of PW,P&IWTD S.R 2012-13)								
	10mm @ 150 C/C		100	1.05	-	-	105.00		
	20nos Slab x 5=100Nos								
	105x0.62=65.10kg						65.10		
	Distributions 8mm @ 200mm C/C		100	0.55	-	-	55.00		
	55x0.39=21.45 kg						21.45		
	20nos Slab x 5=100Nos						86.55		
							0.087		
2	KSRRB M2100-15.1. "KSRRB M2100-14. Plain / Reinforced cement concrete **M20 with OPC cement @ 320kgs**, with 20 mm and down size **graded granite metal** coarse aggregates @ **0.69cum** and fine aggregates @ **0.46cum**, with superplastisiser @ **3lts** confirming to IS9103-1999 Reaffirmed-2008, in open foundation complete as per Drawing & Technical specifications Case - I: Using Concrete Mixer" **MORTH** Specification No.1500,1700 & 2100	Cum				Say	0.10	68178.24	6818.00
	(P.No.223, I.No.27.26 of PW, P&IWTD SR 2012-13)								
	For Slab		20	0.90	0.60	0.10	1.08		
						Say	1.10	4939.92	5434.00
								Tota- A	12252.00
3	Labour charges for fixing of precast slab								
	(P.No.XXXXV, Sl No 3 & 5 of PW, P&IWTD SR 2012-13)								
	Zone-I								
	Mason Class I(With Tools)	per day	1				1	176.58	177.00
	Mazdoor Light /Bisti	per day	2				2	171.58	343.00
4	**Pointing in CM(1:3) for drain slab**	Cum	20	0.90	0.025	0.025	0.011		
	Materials:								
	Gement required is **35.7%** =0.357 cum of cement per cum 0.51t	Qt					0.57	640.00	367.00
	(P.No.V, Sl No 132 of PW, P&IWTD SR 2012-13)								

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು 2

Sl. No.	Description of work	Unit	No.	Length m	Breadth m	Depth m	Total Quantity	Rate in Rs.	Amount in Rs.
	Sand 1.07 per cum	Cum					0.01	950.00	11.00
	(P.No.II, Sl No 59 of PW, P&IWTD SR 2012-13)								
	Labour								
	Mason Class I 0.25per 1.0 cum	each	0.003				0.003	176.58	0.50
	(P.No.XXXXV, Sl No 3 & 5 of PW, P&IWTD SR 2012-18)								
	Mazdoor /Bisti 0.50per 1.0 cum								
	(P.No.XXXXV, Sl No 3 & 5 of PW, P&IWTD SR 2012-13)								
		each	0.01				0.0056	171.58	1.00
	Water man 0.20 per 1.0 cum								
	(P.No.XXXXV, Sl No 3 & 5 of PW, P&IWTD SR 2012-13)								
		each	0.002				0.0023	171.58	0.39
5	Transportation charges (Tractor)								
	(P.No.XXXVIII, Sl No 37 of PW, P&IWTD SR 2012-13)								
		hour					8.00	162.00	1296.00
								Total-B	2195.88
6	Overhead charges @ 10% for item No 3,4&5								219.59
7	Add for Contractor Profit @ 10% for item No 3,4&5								219.59
									14887.06
							10Sqm	Say	14890.00
							Per Sqm		1489.00

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ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಸಂಚಾರ-ಕೇ-2, ಬಿ.ಬಿ.ಎಂ.ಪಿ

Project: Proposed Construction of Elevated Corridor by integrating Ejipura Main Road - Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Data Rate for Anticorbonate Painting

Sl. No.	Description	Unit	Quantity	Rate In Rs.	Amount in Rs
1	**Anti carbonate painting** with approved colour as per specifications including cost of materials, labour etc., complete as per specifications and as directed by the Engineer in Charge.				
	The external walls shall be treated with the single component, flexible, elastomeric coating MASTERSEAL 200 H based on acrylic co-polymers. The product shall be applied in 2 coats to achieve a total DFT of 150 microns, after the Acrylic primer coat of MASTERSEAL 399 .After the first coat the surface has to be left for 4 to 5 hrs then followed by the application of the second coat.				
	Unit = 1Sqm				
a	As per Quotation from BASF. (Quotation enclosed)	Sqm	1.00	155.00	**155.00**
b	Supply & Apply by authorized applicators @ 10%				15.50
c	Statuary Levies & applicable Taxes @ 7%				10.85
				Sub total A	**181.35**
d	Add for Contractor Profit @10%				18.14
				Sub total B	**199.49**
	Cost per Sqm			**Say**	**200.00**

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Annexure A.9.2

Estimated Annual User Costs and Savings on Elevated Corridor

Proposed Construction of Elevated Corridor by integrating Ejipura Main Road – Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore

Estimated Annual User Costs and Savings on Elevated Corridor

Rs. in Lakh

	Vehicle Operation Cost (VOC)				Vehicle Operation Time (VOT)				
Year	Without Elevated Corridor	On Elevated Corridor	At Surface	Saving	Without Elevated Corridor	On Elevated Corridor	At Surface	Saving	TTL SVG
2013	11420.43	6074.16	3065.51	2280.76	19166.99	10965.20	4650.98	3550.81	**5831.57**
2014	11882.66	6304.21	3181.81	2396.64	19532.76	11174.89	4741.42	3616.45	**6013.09**
2015	12374.25	6543.51	3302.81	2527.94	19907.16	11389.53	4834.02	3683.61	**6211.55**
2016	13583.41	7159.51	3564.70	2859.20	21823.39	12487.04	5230.55	4105.80	**6965.00**
2017	14056.41	7382.74	3676.01	2997.65	23196.41	13273.28	5561.16	4361.96	**7359.62**
2018	14551.22	6846.65	3790.99	3913.58	23482.86	11621.06	5631.39	6230.41	**10144.00**
2019	16692.98	7355.96	4222.59	5114.43	26902.20	12364.85	6281.11	8256.24	**13370.67**
2020	17278.20	8991.95	4353.99	3932.26	27226.78	15574.46	6359.22	5293.10	**9225.36**
2021	17833.01	9240.95	4586.69	4005.37	28832.79	16493.68	6972.95	5366.16	**9371.53**
2022	19092.73	8474.56	4714.37	5903.80	30819.15	14551.03	7034.76	9233.35	**15137.16**
2023	19718.00	8717.22	4984.96	6015.81	31085.55	14684.28	7355.70	9045.57	**15061.38**
2024	20372.11	9170.40	5123.86	6077.85	31355.22	15309.99	7421.17	8624.06	**14701.91**
2025	22052.43	9850.60	5569.52	6632.32	35599.82	17264.27	8479.67	9855.87	**16488.20**
2026	22714.66	10349.04	5604.09	6761.54	35768.05	17782.20	8368.21	9617.64	**16379.18**
2027	23410.44	11175.59	5997.69	6237.17	35937.85	19009.64	8956.68	7971.52	**14208.69**
2028	24523.87	11522.32	6154.87	6846.67	37142.00	19313.03	9000.01	8828.96	**15675.63**
2029	25111.99	11803.03	6760.79	6548.17	39190.30	20383.75	10385.61	8420.93	**14969.10**
2030	25841.74	12468.00	6937.78	6435.95	39383.26	21329.00	10435.63	7618.64	**14054.59**
2031	27621.75	12991.24	7382.58	7247.94	41825.22	21888.99	11002.92	8933.31	**16181.25**
2032	28420.80	13759.85	7558.79	7102.16	42032.79	22973.29	11055.97	8003.54	**15105.69**
2033	29256.52	14096.01	8064.70	7095.81	42242.29	23094.41	11686.50	7461.37	**14557.18**

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Chapter – 10

Legal Assessment

CHAPTER 10
LEGAL ASSESSMENT

10.1 Land Acquisition

The Project Area lies in South Eastern Part of Bangalore City in a thickly developed Residential and Commercial Area. 4819.257 Sqm of Land needs to be acquired to realize this Corridor Improvement Scheme. Details of Land Acquisition are given in **Drawing No. MC / BBMP / 2618 / ELC – IRR / LAD / 106A, Drawing No. MC / BBMP / 2618 / ELC – IRR / LAD / 106B** and **Drawing No. MC / BBMP / 2618 / ELC – IRR / LAD / 106C** respectively. There is no Scope for Parking of the Vehicles in Post Construction Scenario of the Project, thus the Project would provide the expected Relief to the traffic proposed.

10.2 Enforcement Measures

BBMP has planned to take Precautionary Measures during the Construction Phase to enforce Traffic Diversion and minimizing the effects of various Pollutions. Through the Institutional Framework suggested, BBMP will coordinate with the Traffic Police, BMTC and Utility Operators like BESCOM, BWSSB for the Shifting of Existing Utility Lines, which are going to obstruct the Execution of the Project. Since BBMP is the Obligatory Provider of Citizen Services in the City, it has powers by statue to require other Government and Non Government Agencies to implement Plans in Public Interest.

BBMP has also notified the List of Underpasses and Flyovers that it proposes to construct under JNNURM and thus it is making the Residents and Commercial Establishments aware of the possible disturbances that could emerge on account of the Implementation of the Projects.

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Chapter – 11

Institutional Framework

CHAPTER 11
INSTITUTIONAL FRAMEWORK

11.1 Road Network

There are multiple Agencies of the Government that are directly involved and accountable to ensure that the Road Network, as part of the Overall Transport System, is maintained to the Required Standards in the City. The Agencies are Bruhat Bangalore Mahanagara Palike (BBMP) who is directly responsible as the Implementing Agency as well as the Entity vested with the Construction and Maintenance of the Roads in the City. The other important agency is Bangalore Metropolitan Transport Corporation (BMTC), which is State owned Transport Corporation. The study of the current situation, however, reveals that the coordination between BBMP and BMTC shall be improved to enhance the Utilization of the Road Network and also evolve Common Agreed Programmes to decongest the Traffic and build Capacity. The Third Agency having a stake in the Regulation of Traffic on the roads is the City Traffic Police. The Focus of the Traffic Police is to maintain free movement of vehicles and regulate the parking of vehicles to avoid congestion. Due to rapid explosion of number of vehicles in the city, the Traffic Police have resorted to make number of arterial roads within the city as one way thus increasing the Travel Time and Distance for the Road Users including the Bangalore Metropolitan Transport Corporation (BMTC) Buses.

The fourth agency involved in the issue is Bangalore Development Authority (BDA) who constructs and maintains some of the Grade Separators, Ring Roads and Specified Roads within the city. There is no clarity in allocation of construction projects between BDA and BBMP in respect of Grade Separators and Roads. BDA also allots and plans residential and commercial sites in and around Bangalore. When sites are allotted without considering the laying of internal service roads and main roads, vehicle owners have little choice but to resort to make shift arrangements in forming lanes, which after few years become the basis for laying roads. These lanes, which get formed without Soil Study and other Criteria pose major problems when take up for Construction of Proper Roads.

The Government is examining the feasibility of delineating the roles and responsibilities of the Stakeholders engaged in development and maintenance of the Road Network within Bangalore. To channellise into financing for major projects will be improved if the Clear Role Responsibility is defined.

Institution	Primary Role	Impact on Road Network	Area of cooperation	Severity of non – cooperation / inaction
BBMP	Planning, Development, Financing, Construction, Operation and Maintenance.	Determining Capacity in terms of Volume of Traffic.	Timely Execution of Projects, Educating the Citizens on Proper Road Use including that of Footpaths.	Medium to High
BMTC	Planning, Development, Operation and Maintenance of fleet of Buses to carry Passengers; Route Planning, Scheduling and Upkeep of Transport System.	Traffic Congestions, Blocking of Traffic near Bus Shelters.	Integrated Planning and Development of Road Network, Route Development and Scheduling.	High
BDA	Land Use Planning and Allotment of Sites.	Independent Functioning causes Surprises and Hold ups.	Coordination with BBMP and BMTC to create the Infrastructure in a Coordinated Manner while Allotting Sites and Under rating Construction of Grade Separators and Roads.	Medium
Traffic Police	Regulation of Traffic, Traffic Diversions and Parking Regulations.	Determines the Flow of Traffic, Congestions, Accident Removal Mechanisms and Safety for Road Users.	Participate in Planning and Development of Road Infrastructure and coordinate with BBMP and BMTC while issuing Regulations in respect of Traffic including Special Occasions.	Medium
Government of Karnataka	Policy making	Bad Road Network, Inadequate Fund Allocation, Improper Planning.	Define the Role and Responsibility of BDA and BBMP in respect of Planning and Development of Road Network within Bangalore.	Establish Inter – Institutional Entity for Planning, Development, Financing, Monitoring and Measuring the Performance of the Sector.

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In the absence of a Coordinating Agency, there are several Constraints in the Integrated and Comprehensive Planning and Delivery of Services (to both Citizens and Businesses). Interdepartmental Coordination is one of the prominent issues and conflict that are becoming difficult to address or resolve even at the level of heads of the Service Delivery Agencies. It is observed that the citizen is often concerned with the quality of service rather than who is delivering the service. The Service Delivery often suffers because more than one agency is involved and there is no mechanism for ensuring Interagency Coordination. The area to be addressed in a critical manner is 'Functional Overlaps & Coordination Requirements'.

To realize the Outcome of Free Flow of Traffic and Accident Free Roads with clean environment, all the above Agencies need to participate and implement plans in an Integrated and Coordinated Manner. The Government of Karnataka represented by the Urban Development Department and the Transport Department has constituted an Inter Institutional Committee with Members drawn from the following to give shape to the Proposal for Coordination and Effective Management of the Road Network and Transport Sector Initiatives.

- Commissioner, BBMP – Chairman of the Committee.
- Secretary, Urban Development, GOK.
- Secretary, Transport Department.
- Managing Director, BMTC.
- Director General, Traffic Police.
- Chairman, BDA.

Another Critical Institutional Aspect for the Road Projects is the need to establish a Dedicated Project Management Cell within BBMP to undertake such a Massive and Citizen Sensitive Project.

11.2 Rationale for a Project Management Unit

There is a need for an Organization, which could handle Joint Projects among Stakeholders cutting across various Government Entities. Such an Organization should address the needs of the city – "A Greater Bangalore", a Techno Polis and Fast Emerging as an Intelligent City. The Informal Arrangement that was started a few years back in the form of BATF needs to be formalized now by establishing a new organization that would focus on delivering Citizen Services by concentrating on Urban Infrastructure Planning and Execution. A Strategic Plan for the City Development in terms of Urban Infrastructure shall be developed by the proposed Organization along with a clear Road Map with Milestones to translate the Strategy into Actions.

To execute a project with Multiplicity of Stakeholders, Profound Project Management Skills and Inter Disciplinary Approaches are essential. In order to effectively implement, monitor and control the schemes envisaged under the Road Network Initiative, it is strongly recommended that a Project Management Unit (PMU) as an Exclusive Entity responsible for Road Projects be established. Funding Agencies stipulate evidence of Professional Management Skills and Best Practices for Sanction and Disbursal of Funds

for such of these Schemes. BBMP has readily accepted the Recommendation and it has been suggested that PMU be established as part of BBMP functioning independently to carry out the Road Projects in accordance with JNNURM Guidelines and Reforms Agenda agreed among the Stakeholders.

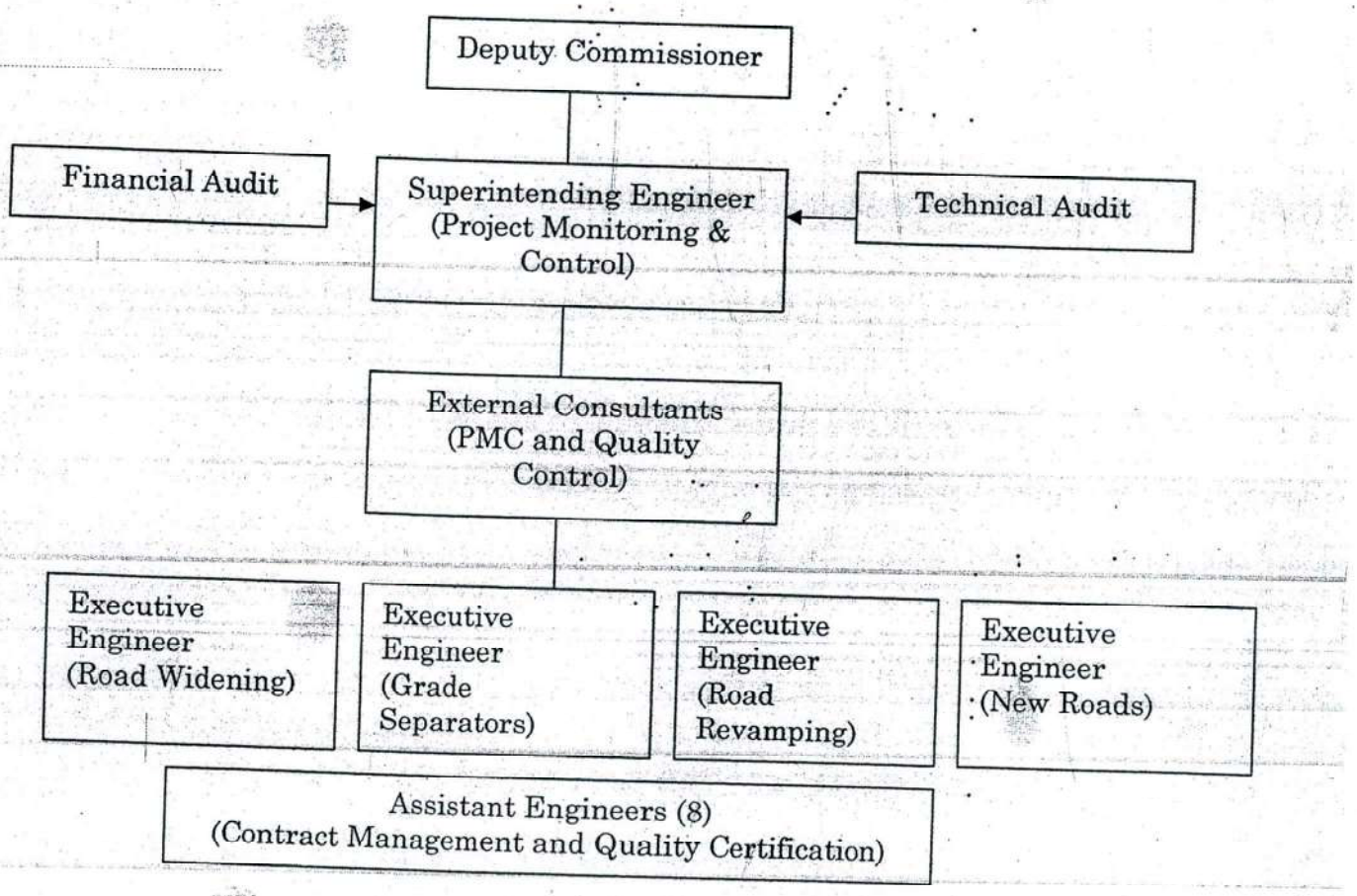
It has been observed in many Infrastructure Project Implementation Schemes that Cost and Time Overruns could have been avoided if a Separate Dedicated Unit or Cell were vested with the Authority and Powers to deal with the Project Implementation Cycle. There has been a significant improvement in performance of dedicated units wherein Policy, Implementation and Regulation are clearly isolated and delineated. It is proposed that PMU functions as an Execution Agency of Policies framed by BBMP / Government and thus focusing on Deliverables in terms of Performance. Weak Institutional Mechanism coupled with lack of application of Contracting Skills affect the Implementation of Large Infrastructure Schemes. Channeling right competencies required for handling such schemes is vital but found to be non existent under Bundled Institutional Setups created around budgetary focus for expenditure monitoring. Performance Measurement in terms of timely completion and construction as per requirements and specifications, are few aspects that are not given due importance under current functioning of these institutions.

Projects executed as part of many Government Schemes are susceptible to delays on account of slow decision making process and sometimes by the application of Bureaucratic Procedures. Focused Attention and Clearly Defined Roles among Implementation Agencies are seldom noticed in routine schemes funded either through Budgetary Allocations or through External Funding Mechanisms. Systems of the Government remain inflexible and unable to cope up with and address the needs of the Funding Agencies and Contractors to deal effectively with Emerging Situations, Uncertainties and Risks.

While establishing the PMU, its Governance Structure, its inter play with various Internal and External Stakeholders and its Role, Responsibility, Powers, Authority and Liabilities need to be defined. More importantly the Framework should highlight on the Organization Structure, the Profile and Attributes of the Chief Executive Officer and Outsourcing Mechanisms to pool Resources. The Recommendation would lay the basis for the Establishment and Operation of the PMU as well as its future role in respect of similar large Urban Infrastructure Projects in Bangalore City.

The likelihood of achieving the project outcomes as per the Specifications and within the Timeframe Planned will be greatly enhanced if the PMU is mandated to design, develop, implement and oversee the Operation and Maintenance Phases. Performance Orientation and Achievement of Measurable Goals would be the Hallmark of PMU and the knowledge gained should also be gradually transferred to its Contractors, Outsource Partners and Stakeholders.

PMU should be designed and structured in such a way that it is Independent and allowed to function as an Autonomous Unit and be part of BBMP. Performance Measures of PMU shall be agreed between the Designated State Government Agency and PMU and also in consultation with Major Stakeholders like BBMP, BMTC, Traffic Police, BDA, etc. Performance of PMU should be evaluated based on its Efficiency and Effectiveness Parameters and evolve Initiatives and Projects that are Economically Viable and Politically Sustainable. PMU could have its Resources picked up from Various Constituents of the Government apart from External Professional Pool. An Organization Structure that would primarily meet with the Engineering and Enforcement Aspects of the Project is developed and presented here. The Administrative Functions like Land Acquisition and Arrangement of Finance are to be dealt with by the Inter Institutional Committee recommended as part of the Reforms Agenda.



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Chapter – 12

Risk Assessment

CHAPTER 12
RISK ASSESSMENT

12.1 In a Road Project there are considerable risks involved during the Implementation of the Project. The Risks during the Operation Phase are minimal and restricted to Over Use of the Road (against Design Assumptions) by heavier vehicles and damage to road surface by accidents and by vehicles carrying overload. In the Current Road Projects undertaken by the BBMP, the Time Frame for Completion varies between 6 to 9 months after Mobilization of Site Resources. The Major Risk relates to buy in of the Project from all Stakeholders, especially those affected by the Construction itself. These are Residential and Commercial Establishments who are close to the Construction Site. They are exposed to Noise Pollution, Dust Pollution and Inconvenience caused due to Inability to use their Vehicles on account of Temporary Closure of the Roads.

Internal Risks come mainly from three Sources: the Project, the Organizations Involved and the Relationships among Partners. Most Projects suffer at least temporarily from a Deficient Project Structure: many are launched even though Objectives are not clear, a Business Case had not been completed, and Milestones were only vaguely defined, if defined at all. These Instances of Lack of or Inadequacy in Definition of Scope occur due to pressure to complete the Planning Stage and to go ahead with the Construction early. On the Organizational Side, Lack of Project Control Mechanisms is the Factor that most impede many Projects. Finally, Risks associated with the Relationships among Partners have been the Major Source of Concern present in all Projects, Lack of Definition of Role and Responsibility as the most important Problem for Project Implementation.

The Risks associated with the Road Projects fall into four Categories.

- Multiple Stakeholder Coordination Risk during Execution of Work (very Critical in the Road Projects of Bangalore).
- Project Risk (Clarity in Scope, Clarity in Role and Responsibility).
- Acquisition of Land and Removal of Encroachments while Widening the Drains.
- Shifting of Utilities – Perfect Coordination among the Concerned Stakeholders and the Contractors.

12.2 Stakeholders

The Stakeholders involved in the Bangalore Road Projects are

- BBMP.
- Utility Companies.
- Traffic Police.
- Public Works Department.
- Residents' Association.
- Shop Owners' Association.
- Pollution Control Board.

12.3 Role of Traffic Police

Coordination with the Traffic Police, Liaison with Residents and Shop Owners' Association is a pre requisite before commencing the Construction Phase. Traffic Police will have to plan for Diversions, Construction of Temporary Structures, Regulation of Traffic during Peak Hours with Extra Resources, etc. Communication through Media and Door – to – Door Campaign in the affected areas are proposed to ensure Smooth Construction Phase.

Traffic Police will also have to develop Alternate Routing for the BMTC Buses that ply in the Roads proposed for Revamping. They need to mark the Zones near the Construction Site as 'No Parking' and allocate Routes and Space for the Vehicles engaged in the Construction Work.

12.4 Shifting of Utilities

In Bangalore Road Network, the Common Utilities that are encountered during the Revamping or Widening are

- Sewer and Drainage Lines.
- Water Supply Lines.
- Electricity Lines and Structures (Mounted Transformers).
- Telecommunication Lines and Structures.
- Street Lights.
- Parking Signs.
- Post Boxes.
- Signals.

The Utilities are to be shifted in coordination with the Concerned Departments. The Key is in sending them Advance Communication and obtaining their Sign off for Proposed Shifting well ahead of the Construction Phase. Underground Utilities are the main concern and pose a major challenge that will need the Commitment and Cooperation of all the Associated Departments. Shifting of Underground Utilities are to be executed in coordination with BWSSB, KPTCL, BESCOM, BSNL and other Private Telecom Operators like Bharti, Tata, Reliance, etc., which have led Optical Fibre Cables along the existing Roads.

12.5 Risk Management

Risk	Stakeholders	Severity of Risk	Solution
Acquisition of Land	BBMP, Government of Karnataka	Medium	A Combination of Enforcement and Rehabilitation measures is required to notify the affected people and provide Alternate Arrangements for living. In the case of road projects the instances are minimal.
Removal of Encroachments	BBMP, BDA, Government of Karnataka	Medium	Legislation followed by proper Enforcement; affected people to be considered for Housing under Basic Services to Urban Poor Plan.
Traffic Management	BBMP, Contractors, Traffic Police	High	A Well Coordinated Traffic Management Plan with clearly Defined Roles is required. Participation of Residents and Shop Owners at the Formulation Stage is also recommended.
Accident Free	BBMP, Contractors, Traffic Police	Medium	Proper Deployment of Resource at critical periods of time and Inspection of Vulnerable Structures and Traffic Diversion Routes.
Dumping of Construction Debris	BBMP, Contractors	Medium	Storage Space shall be allocated along the Construction Site, Instructions for Clearing and Dumping the Debris Outside the Construction Sites shall be issued.

12.6 Internal Risks associated with Road Projects in Bangalore City with Suggested Measures to Address the Risks

Risks Associated with the Project itself	***Characteristics of Clients / Users of the Service:*** Resistance to Change, Lack of Involvement, Inadequate Education Level, Difficulties in Communicating, Unrealistic Expectations. (To overcome BBMP is seeking Citizen Participation through Ward Committees and others for Buy In the Project and Speedy Implementation). ***Scope of the Project:*** Universality or Specificity of the Service, Number of Partners Involved, Number of Clients, Size of Budget. (Contract Documentation being revamped to define the Role and Responsibility very clearly emphasizing on the need to communicate with the Stakeholders at the Critical Times). ***Complexity of the Project:*** Especially Organizational and Technological Complexity. (Consultant would evaluate various assumptions made in the Design and Detailed Engineering while executing the Project and provide Feedback to BBMP). ***Definition and Structure of the Project:*** Unclear Objectives, Ill Defined Specifications and Functional Requirements, Changes in the Scope or the Reach of the Project, Difficulties in Integrating Data or Processes. (Flexibility to Accommodate Changes by the Contractors included in the Contract Documentation).
Organizational Risks	***Lack of Resources:*** Uncertainty of Funding, Inadequate Resources, Lack of Expertise in Complex Resource Management (these may not be critical under JNNURM Funding). ***Project Team Competencies:*** Lack of Experience, Expertise, Stability and Communication Skills. (It is proposed to establish a PMU for Road Projects within BBMP with Requisite Skills and Experience). ***Management Strategy:*** Inadequate or Inappropriate Organizational Support and Control, Absence of a Champion, Lack of Leadership, Unavailability of Tested Management Tools and Processes. (Inter Institutional Committee proposed to deal with Policy Level Decisions including Release of Funds from the State Government). ***Technological Know How:*** Absence of an Adequate Technological Infrastructure and of In House Technological Competencies. (Competencies being Upgraded as well as Latest Construction Practices followed in Road Construction, Material Handling and Disposal of Construction Debris).
Relationship Risks	***Form of Collaboration:*** Inadequate or Inappropriate type of Agreement, Misunderstandings regarding the Content of the Agreement, Inappropriate Selection of Partners, etc. (All Contractual Frameworks to define the Role, Responsibility and Liability of Various Parties clearly; Contractors to be provided with Opportunity to seek Clarification before Accepting the Work). ***Collaborative Process:*** Problems occurring with Coordination, Communications, Inertia, Dependency, Mistrust, Lack of Consensus or Involvement (Change Management Process proposed to be handled by the PMU).

Chapter – 13

Environmental and Social Impact

CHAPTER 13
ENVIRONMENTAL AND SOCIAL IMPACTS

In any Major Developmental Initiative aimed at promoting the interests of the Community or the State / Country, the Associated Environmental Impacts – whether of a Short Term or Long Term Nature, likely to affect the Environment, Ecology and Health of the Community, need to be seriously examined, before embarking on the Proposed Project. The Primary Objectives of the Environmental Impact Assessment (EIA) are to evaluate the Existing Pre Operational Baseline Environmental Status at the Proposed Project Site by Field Studies and Data Collection, and then carry out an Objective Assessment of the Various Impacts on the Environment as a Result of the Proposed Activities.

As "Construction of Elevated Corridor by integrating Ejipura Main Road – Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore" is one of the major Metropolitan Infrastructure Projects for Bangalore, it is imperative to conduct an Environmental Impact Assessment (EIA) to quantify the Benefits accrued to the Community as a result of the Project, while at the same time analyzing carefully the Impact Aspects due to the Project itself, during Construction and Operation Phase Cycles. As these Data are crucial for the Planning and Successful Implementation of the Project, Various Data (such as Nos. of Tree Cutting, Extent of Air and Noise Pollution, etc.) have been collected from extensive Site Studies in accordance with well established Standard Procedures.

The Existing Road Infrastructure around the Project Corridor have deteriorated remarkably as a result of lack of investment and multifold increase in traffic volume and have to be upgraded to higher service levels in order to reduce transport cost in support of Socio Economic Development.

Discussions have been held with Government and Non Governmental Organizations and a Detailed Site Assessment have been carried out to provide the Basic Background for Impact Identification and Assessment. A Scoping Exercise has also been carried out at the Pre Construction Stage to identify and highlight the Key Issues and Impacts likely to occur during the Construction, Operations and Maintenance Phases of the Project, as well as to identify those Impacts which could, but are unlikely to occur. Practical and Cost Effective Benefit Enhancement and Mitigation Measures have been identified and outlined, taking into account alternative approaches that are appropriate to the situation. A Management and Monitoring Plan has been developed to provide a sound basis for ensuring that the specified benefit enhancement and mitigation measures are fully adopted.

For Planning and Implementation of "Elevated Corridor by integrating Ejipura Main Road – Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along 100ft. Inner Ring Road, Koramangala, Bangalore", we have given due attention to the Environmental and Social Issues. The Various Issues addressed under this Section are as follows.

13.1 Environmental Impact

13.1.1 Green Cover

Bangalore City – with its rich flora and abundant green cover and being host to Lalbagh and Cubbon Park, which are renowned Botanical Gardens, is rightly called the "Garden City of India". Bangalore City bagged the Central Government sponsored "Indira Priyadarshini Vruksha Mitra" Award in the late 1980s in recognition of its extensive green cover. But today, lung space is shrinking in the city and core areas have lost green cover with increase in concrete structures. As a part of this Project, to acquire obstruction free area, 286 trees have to be cut in the Project Area. Considering the Benefits of the Project and the Compensatory Afforestation Plan envisaged, it has been observed with management plans consisting of planting of trees in the ratio of 1:2, proactive afforestation for green cover and development of green ribbon in and around the project area, it will be abundantly compensating the green cover.

13.1.2 Air Pollution

Air Pollution Level will go up during the Construction Stage due to operation of construction yards, material transport on trucks and due to heavy earth moving machinery exhaust emissions (e.g. SPM, RSPM, NO_x, SO_x, CO, etc.) from the Construction Site. These are not permanent in nature, but minor, temporary and mitigeatable. In the Post Construction Scenario, the General Level of Air Pollution in the Project Area will be significantly less than the current level due to improved movement of vehicular traffic and removal of idling time and thus this Project ensures better environment. The Consultant has collected data regarding existing Air Quality in and around the Project Area and is given in **Table 13.1**. All vehicles delivering materials to the site will be covered to avoid spillage of materials. All existing Highways / Roads used by vehicles of the Contractor, or any Sub Contractor or Suppliers of Materials or Plant and similarly Roads, which are part of the Works, will be kept clean and clear of all dust / mud or other extraneous materials dropped by such vehicles. The unloading of materials at construction sites close to settlements will be restricted to night time only. Vehicles and Equipment will be fitted with Exhaust Silencers. During routine service operations, the Effectiveness of Exhaust Silencers will be checked and if found defective will be replaced. Unpaved Haul Roads near / passing through residential and commercial areas to be watered thrice a day. Trucks carrying construction material are to be adequately covered. All Earthworks will be protected in a manner acceptable to the Engineer (such as Barricading the Construction Site) to minimize Dust Nuisance in the surrounding area. The Contractor will take every precaution to reduce the Level of Dust along Construction Sites involving Earthworks, by frequent application of water.

Table 13.1

Ambient Air Quality Monitoring

Type of Monitoring — **Ambient Air Quality**
Date of Sampling — **17 – 04 – 2013**
Duration of Sampling — **24 hrs.**
Instrument used for Monitoring — **Respirable Dust Sampler APM 460 & 411.**

Descriptions	Value in µg / m³	
	Existing	Permissible
Respirable Particulate Matter	[illegible]	120.0
Suspended Particulate Matter	[illegible]	360.0
Oxides of Sulphur	49.7	80.0
Oxides of Nitrogen	68.4	80.0

13.1.3 Water and Soil pollution

The Surface and Underground Water and Soil Pollution Aspects are not likely to be greatly influenced, unlike Air Pollution Quality by the Construction of Elevated Corridor along 100ft. Inner Ring Road. However, there could be Indirect Impact on the Water and Soil Components in the long run.

As the Project Activities need substantial water quantities for construction processing, dust proofing, cleaning of vehicles and batch mixing, etc. there could be considerable demands on water resources available. Necessary arrangements and contingency plans with BWSSB and Arrangement for Supply of Recycled Water should be made to meet the Water Demands, without in anyway affecting the city's normal water supply demands.

All the Proposed Project Components will be in Well Developed Areas of the City with Distinct Land Usage Patterns ranging from Residential to Commercial Activities under Well Established Conditions. As Construction Activities are primarily land based, many Impacts can be identified in the Soil Component in the Proposed Area. Excavation Activity will produce a lot of rubble from excavated soil, needing disposal. The excavated soil / debris will be disposed by covered trucks to avoid Dust Nuisance in the Project and Surrounding Areas. Debris generated due to the dismantling of the existing pavement structure shall be suitably reused in the Proposed Construction, subject to the Availability of the Material and the Approval of Project Engineer. The Contractor shall suitably dispose of Unutilized Debris Material; either through filling up of Borrows Areas created for the Project or at Pre Designated Dump Locations, subject to the Approval of the Project Engineer. Debris generated from different Construction Activities shall be disposed of in such a way that it does not flow into the Surface Water Bodies or form Mud Puddles in the area.

13.1.4 Noise Pollution

As the Project involves significant uses of Heavy Machineries, Traffic Diversion, etc. hence Noise Concern will be a major issue during Construction Phase. But the Post Construction Scenario ensures a Better Environment in the Project Area, as the General Level of Noise Pollution in the Project Area will be significantly less than the Current

Level due to Improvement in the Movement in Vehicular Traffic and Removal of Idling Time. The Consultant has collected existing Noise Level Data in and around the Project Area and is given in **Table 13.2**. To mitigate the Noise Impact, Direct Technical Remedies including Low Noise Road Surface, Road Covers and Roadside Noise Barriers will be provided. Noise Limits for Construction Equipment used in this Project (measured at one metre from the edge of the equipment in free field) such as Compactors, Rollers, Front Loaders, Concrete Mixers, Cranes (movable), Vibrators and Saws will not exceed 75 dB (A), as specified in the Environment (Protection) Rules, 1986. Notwithstanding any other Conditions of Contract, Noise Level from any Item of Plant (s) must comply with the Relevant Legislation for Levels of Noise Emission. The Contractor will ensure that the AAQ Concentrations as these Construction Sites are within the Acceptable Limits of Industrial Uses in case of Hot Mix Plants and Crushers and Residential Uses around Construction Camps. Noisy Construction Operations in Residential and Sensitive Areas (Hospitals, Schools and Religious Places) should be restricted between 0730 hrs. and 1800 hrs. Preventive Maintenance of Construction Equipment and Vehicles would be done to meet Emission Standards and to keep them with Low Noise. Earplugs will be provided to Operators of Heavy Machinery and Workers in near vicinity. Material Transport should be uniformly distributed during nights to minimize Noise Impacts.

Part of the Costs, particularly the Implementation of Environmental Measures is included in the Unit Rates for the Works and is responsibility of the Contractor.

But check this —

Pls go thru unit rates again

Table 13.2

Existing Noise Level Monitoring

Date of Sampling 17 – 04 – 2013
Instrument used for Monitoring Sound Level Meter Lutron SL – 4001
Permissible Limits 75 dB (A) – Day Time
70 dB (A) – Night Time

Sl. No.	Time Interval	Noise Level in dB (A)
1	0600 hrs. to 0700 hrs.	70.5
2	0700 hrs. to 0800 hrs.	71.1
3	0800 hrs. to 0900 hrs.	73.4
4	0900 hrs. to 1000hrs.	73.7
5	1000 hrs. to 1100 hrs.	74.2
6	1100 hrs. to 1200 hrs.	74.9
7	1200 hrs. to 1300 hrs.	73.5
8	1300 hrs. to 1400 hrs.	72.7
9	1400 hrs. to 1500 hrs.	72.5
10	1500 hrs. to 1600 hrs.	74.2
11	1600 hrs. to 1700 hrs.	74.3
12	1700 hrs. to 1800 hrs.	74.5
13	1800 hrs. to 1900 hrs.	75.2
14	1900 hrs. to 2000 hrs.	75.8
15	2000 hrs. to 2100 hrs.	72..
16	2100 hrs. to 2200 hrs.	70.8

13.2 Social Impact

The Direct and Indirect Job Opportunities that will be provided by the Project can be considered as a Positive Aspect. The Local People will be directly employed to work at the Construction Sites and others will be employed in Sectors of the Economy, which have been developed by the Road such as the Service Sectors. Some individuals may gain skills that can be applied in other Road Construction Projects.

Contract Documentation will be crafted in such a way that the Construction Work does not cause undue Inconvenience to Residents, especially the Sick and Old People. Removal of Construction Debris promptly from the Site falls within the Scope of Work of the Contractor. Asphalting, the Major Work, involved in the Road Construction would invariably be carried out during the nights with Proper Inspection Team supervising the Process.

The table below summarizes the Negative Environmental and Social Impacts and Mitigation / Benefit Enhancement Measures for the Negative Impacts, as well as the responsible body to implement the measures.

Type of Impact	Mitigation Measure	Responsible Body for Implementation
Impact on Settlement	Minimize the Risk at the Road particularly in a Dense Settlement Area.	Consultant and Contracto
	Allow Affected Persons to Salvage Building Materials and other Assets.	BBMP and Contractor.
	Pay Compensation and Resettle the Affected People.	BBMP.
Impact on Health	Do not Induce Water Related Diseases by creating Temporary and Permanent Water Holding Areas, which favour Mosquitoes.	BBMP and Contractor.
	Minimize Dust Emission by Watering the Road during Construction.	Contractor.
	Put Visible and Appropriate Warning Signs on the Road during Construction.	Contractor.
Impact on Existing Infrastructure	Relocate Power Lines, Telephone Lines and Water Points before Commencing of the Road Construction and in few cases during the Construction Phase.	Utility Companies an Contractor.
Impact on Cultural, Religious and Archeological Resources	Design Roads to avoid such Sensitive Places.	Design Consultant.
Road Safety during Construction and Operation Phase	Install Road Safety Signs at all Accident Prone Spots as Installation / Erection of Safety Signs.	Traffic Police / Contractor.
	Provide Traffic Awareness.	Contractor in collaboratio with Traffic Police of th Area and Local NGO.
	Use Clear, Properly Labelled and Meaningful Traffic Signs and Speed Limits, especially at Pedestrian Road Crossing.	Contractor in collaboratio with Traffic Police of th Area.
	Assign Traffic Personnel to regulate the Passage of Construction Vehicles (carrying debris as well).	Contractor in collaboratio with Traffic Police of th Area.
	Construct Half of the Road while the other is used for Traffic where feasible.	BBMP and Contractor.
Social Impact from Migrant Workers	Construction Workers will be given Health Awareness.	NGOs in collaboration wit the Contractor.
	Avoid accommodating Labour Force in or directly adjacent to Construction Sites.	Contractor.
	Recruit Work Force from the Local Community giving more chances to Women.	BBMP and Contractor.

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Chapter – 14

Financial and Operating Plan

CHAPTER 14
FINANCIAL AND OPERATING PLANS

Construction and Maintenance of Road Infrastructure within City Limits is the Obligatory Function of the Local Body, BBMP. The Road Projects when implemented would not generate Additional Revenue for the BBMP. Thus, it is a Social Infrastructure Project attempting to improve the Transport System, which is one of the Backbone Infrastructures for the City's Economy. Traditionally, the BBMP has been undertaking Revamping of Roads, Widening and Construction of Grade Separators based on availability of Funds. Thus, though a Priority List of Roads await Reconstruction, due to Lack of Funds the Condition of the Road Network in the City has become unacceptably bad affecting the normal movement of vehicles. These Characteristics of the Project lend itself for Grants, Aid and Soft Loans. Not withstanding the above Social Aspects, the BBMP would provide appropriate support to the Project by Means of Initial Seed Amount and through Budget Provision to support the Operation and Maintenance of the Road Network once constructed. The Portfolio of Roads that the BBMP would be focusing on is the Arterial Roads that run from North to South as well as from East to West. These are the Feeder Roads to the layers of Ring Roads that surround the Bangalore City.

Since, the BBMP has been implementing Road Projects on an ongoing basis, the Estimation of Costs and Times for the Proposed Projects approved by the BBMP would be Realistic and close to Actual Implementation. The Operating Plan takes into consideration of the Implementation Schedule of each of the Projects.

The BBMP is entitled to receive a Part of the Cess already being levied on Fuel for the Mass Rapid Transit System termed as the Core Transport Sector Initiative. Consideration by the Government to part release the Collection under the Cess would help the BBMP financially to fund the Priority Road Projects.

The Cash Flow Chart (last 5 years on Actual basis and Projections for the next 20 years) and Debt and Loan Schedule furnished by the BBMP are given in **Table 14.1** and **Table 14.2** respectively.

MANASA CONSULTANTS

Table 14.2

Loan Schedule and Loan Aging																								
Long Term Debt Situation of BBMP (Rs. in Lakh)																								
Details of Loan & borrowings						**Overall**	**Repayment Schedule**																	
Loan	**Source**	**Year Taken**	**Original Loan Amount**	**Terms in brief**	**loan tenure**	**Total Loan Outstanding**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Loan 1	vijaya bank	2010	7500	10.95	9	7703		307	836	1350	1774	1654	1535	1489	1370	1250	591							
Loan 2	corporation bank	2009	12500	12.25	5	8308	3874	1197	3383	5259	4743	2198												
Loan 3	corporation bank	2010	20000	10.65	9	19804		1006	2287	3873	4838	4387	4092	3809	3537	3265	1543							
Loan 4	syndicate bank	2009	15000	11	9	9141	1564	1505	4037	3756	3474	3192	2780											
Loan 5	syndicate bank	2009	20000	11	9	11912	1201	5130	51489	4787	4426	4066	1901											
Loan 6	syndicate bank	2010	30000	10.75	9	26342		2849	46	696	6552	6145	5739	5484	5077	4404								
Loan 7	canara bank	2010	12500	12	9	11874		1218	2403	302	2810	2600	239	2258	2048	481								
Loan 8	canara bank	2010	50000	11.25	9	45555		4749	5375	12230	11460	10700	9927	9447	8679	7903								
Loan 9	canara bank	2010	7500	11	9	7396		311	787	1048	1761	1648	1535	1493	1381	1268	884							
Loan 10	canara bank	2010	10000	11	9	10201		310	1050	1399	2350	2200	2049	1993	1842	1692	1160							
Loan 11	Hudco Bank	2012	50000	12	9	500000						3846	3846	3846	3846	3846	3846	3846	3846	3846	3846	3846	3846	3846
Loan 12	Hudco Bank	2012	24954	12	9	23724			1818	2424	2424	2424	2424	2424	2424	2424	2424	2424	2424	2424				
Notes																								

1 Loan refers to lon term loan ie having tenure of greater than 1 Year-
2 Repayment schedule of the 10 year time frame is being requested
3 Terms cover : tenure, interest rate, moritorium period, total repayment period
4 Original loan amount to cover only principal
5 Total loan outstanding includes pricipal and interest

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Loan Debt Situation of BBMP: Aging Analysis of Total Arrears						
Details of Loans & borrowings				Aging Analysis (in Years)		
Loan	Source	Year Taken	Total Loan Outstanding	<3 Years	3-5 Years	>10 Years
Loan 1	vijaya bank	2010	7703			
Loan 2	corporation bank	2009	8308			
Loan 3	corporation bank	2010	19804			
Loan 4	syndicate bank	2009	9141			
Loan 5	syndicate bank	2009	11912			
Loan 6	syndicate bank	2010	26342			
Loan 7	canara bank	2010	11874			
Loan 8	canara bank	2010	45555			
Loan 9	canara bank	2010	7396			
Loan 10	canara bank	2010	10201			
Loan 11	Hudco Bank	2012	500000			
Loan 12	Hudco Bank	2012	23724			

Chapter – 15

Implementation Plan

CHAPTER 15
IMPLEMENTATION PLAN

The entire Project Period has been divided into two parts viz.

1. **Tendering Stage and Finalisation of Contract.**
2. **Execution of the Project including Utility Shifting.**

The 1st Part will entail a period of **180 Days** whereas the 2nd Part will entail a period of **915 Days**.

Thus, the Total Time to handover the Project to the BBMP will be **1095 Days** from the Date of Notice Inviting Tender.

The Detailed Implementation Plan for the Project is attached in **Annexure A.15.1.**

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Annexure A.15.1

Implementation Plan

Chapter – 16

Community Participation in the Project

CHAPTER 16
COMMUNITY PARTICIPATION IN THE PROJECT

- Any Infrastructure Development Activities of BBMP are planned and implemented through Community Participation Process. Local Government Institutions at various levels are involved in the Implementation of Projects. Moreover, NGOs are involved to assist BBMP in Social Mobilization Aspects for Planning and Implementation of the Project. As a part of Participatory Development, Beneficiary Groups and User Committees, such as Labour Contracting Society, Market Management Committee, Road User's Committee, Water Management Committee, Local Resident Association, etc. have been consulted under various Projects of BBMP. Involvements of the Private Sector, Local Government Institutions, NGO and Beneficiary Groups have significantly contributed to Smooth Planning, Implementation and Operation / Maintenance of Infrastructure Development Schemes of BBMP at the Local Level. Consultation with various Stakeholders has been an Integral Part of Project Formulation Phase. People have been interviewed along the route, including Elders and Elected Members of the Community, have given a positive reaction to Road Improvement. The Project Corridor is very important in terms of connecting the National and State Highways with Core Areas of the City. Social Acceptability of the Project Corridor is very high.

- This Project will have many Positive Impacts on Beneficiary Livelihoods and in the Potential Economic Expansion of the Region. Beneficiaries of this Project include Bangalore Metropolitan Transport Corporation (BMTC) Authority, Commuters using this stretch of road, Local People in and around of the Project Area.

- Public Opinion with regard to Public Projects cannot be ignored. It plays a very important Role in the Decision Making Process. Given the Chaotic Road Traffic in and around the Project Corridor, Public Opinion Survey has been conducted on the basis of a Sample of Cross Section of Intelligentsia drawn from Lawyers, Doctors, Engineers, Academicians, Journalists, etc. the Opinion Makers in Urban Situation. Interactive Sessions with NGOs and Various Members of the City Public also formed part of the Exercise in this Direction.

- Prior Information to the Public, before the Start of the Work, regarding the Project will be given through Paper Notification.

  Boards, comprising Important Data regarding the Project (such as Project Name, Name of the Agency executing the Work, Name of Local Government Body taken up the Project, Date of Commencement of the Project, Projected Date to Complete the Work, etc.) for notifying people will be displayed at the major junctions in and around the Project Area.

- Adequate Actions to direct and regulate Traffic shall be taken in consultation with BBMP / Traffic Police to prevent jamming roads during Construction Period. While planning alternative routes, care shall be taken to minimize Congestion and Negative Impacts on Sensitive Receptors such as Schools and Hospitals. Traffic Controls and Diversions marked with Signs and Lights and Other Measures (flags) should be provided. Prior to

creating Diversions and Detours, the Citizens will be consulted well in advance through Citizen's Meetings. It should be an informed decision taken through Public Participation. The Temporary Traffic Detour will be cleaned regularly.

- Another significant aspect of the Construction of Elevated Corridor along 100ft. Inner Ring Road would be its Severe Dislocation Effect on the Existing Public Utilities like Electrical System Network (including Street Lighting), Sewerage Lines and Water Supply Network, etc. as the Project Stretch is located in thickly developed Residential and Commercial Area of Bangalore. As the Public Utility Network are very vital for a normal functioning of an Urban Metropolis, a Detailed Survey of Existing Utilities and their Diversion or Reinstallation on a temporary or permanent basis should be planned in a proactive manner and organized with minimum loss of time and inconvenience to the community. Prior Information through Paper Notification will be given to the affected area people before Shifting any Utilities.

- The Project is judged to be Environmentally and Socially Acceptable.

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Chapter – 17

Conclusion

CHAPTER 17
CONCLUSION

17.1 The Project Corridor, located in the South East Quadrant of Bangalore City, is a part of 100ft. Inner Ring Road and it connects Koramangala with Old Airport Road, Indira Nagar, Marathalli and National Highway No. 4 (Old Madras Road) at Indira Nagar near BDA Shopping Complex through Defence Area on northern side and with Madiwala, National Highway No.7 (Hosur Road), Electronic City on southern side and the Volume of to and fro Vehicular Traffic between Indira Nagar and Electronic City along the Project Corridor is very significant. At present the to and fro Vehicular Traffic between Indira Nagar and Electronic City is moving smoothly between Domlur Flyover and Ejipura Main Road – Inner Ring Road Junction but the same Traffic while moving between Ejipura Main Road – Inner Ring Road Junction and Hosur Road Junction near Kendriya Sadana is facing lot of hindrances to move further due to existence of Cross Roads at almost every 30m across the Project Corridor. Further, many Improvement Proposals have been proposed and are being proposed by Urban Local Bodies in order to improve the Level of Service along Hosur Road Corridor. With this, the only left out link will be between Ejipura Main Road – Inner Ring Road Junction and Hosur Road Junction near Kendriya Sadana that needs immediate attention. In view of these, BBMP wants to elevate the Traffic between Ejipura Main Road – Inner Ring Road Junction and Hosur Road Junction near Kendriya Sadana in order to provide this significant volume of traffic a smooth connectivity and to ease the Vehicular Traffic Movement at Grade in order to reduce the Idle Time and Accidents. As a part of this Elevated Corridor Proposal the Major Junctions that will be tackled along 100ft. Inner Ring Road are

- Ejipura Main Road – Inner Ring Road Junction: Four Arm Junction.
- Sony World Junction: Four Arm Junction.
- Kendriya Sadana Junction – Four Arm Junction.

Kendriya Sadana Junction is located at about 500m away from NH – 7 (Hosur Road), Ejipura Main Road – Inner Ring Road Junction is located at about 5.5 km away from NH – 4 (Old Madras Road), the Distance between Kendriya Sadana Junction and Sony World Junction is about 1.3km and the Distance between Sony World Junction and Ejipura Main Road – Inner Ring Road Junction is around 680m.

Traffic Intensity at Ejipura Main Road – Inner Ring Road Junction is 8157 PCU / hr. during Morning Peak Hour between 0900 hrs. and 1000 hrs. and 9303 PCU / hr. during Evening Peak Hour between 1800 hrs. and 1900 hrs.

Traffic Intensity at Sony World Junction is 10920 PCU / hr. during Morning Peak Hour between 0900 hrs. and 1000 hrs. and 11473 PCU / hr. during Evening Peak Hour between 1800 hrs. and 1900 hrs.

Traffic Intensity at Kendriya Sadana Junction is 7455 PCU / hr. during Morning Peak Hour between 0900 hrs. and 1000 hrs. and 6820 PCU / hr. during Evening Peak Hour between 1800 hrs. and 1900 hrs.

17.2 Concept Proposals

The Proposal for Corridor Improvement Scheme includes Junction Improvements by proposing Elevated Corridor by integrating Major Junctions like Ejipura Main Road – Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along with one Up Ramp and one Down Ramp at Kendriya Sadana Junction; Widening of existing Carriageway; Link Improvements such as Provision of Footpath, Pedestrian Crossing Facilities; Construction of Drain; Upgradation of Utilities; Improvement to existing Culvert over Storm Water Drain; Provision of Effective Illumination; Lane Marking; Provision of Studs and Delineators; etc.

4 lanes divided bi directional Elevated Corridor has been proposed along 100ft. Inner Ring Road by integrating Major Junctions like Ejipura Main Road – Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction along with one Up Ramp and one Down Ramp at Kendriya Sadana Junction. Slip Road of 10.5m Width and Footpath of minimum Width 2.5m have been proposed on either side at Grade Level. Obligatory Spans of various dimensions based on the existing Site Conditions have been proposed at Ejipura Main Road – Inner Ring Road Junction, Sony World Junction, Koramangala 8th Main Road Junction, Koramangala 60ft. Road Junction, Koramangala 5th Block 1A Cross Road Junction, Koramangala BDA Complex Junction and Kendriya Sadana Junction to take care of the Vehicle Turning Movements at Grade.

17.3 Project Cost

As part of DPR, Detailed Cost Estimate has been prepared for the Elevated Structure and Surface Level Roads based on the Detailed Engineering Design. To accommodate the proposed Elevated Corridor Scheme along 100ft. Inner Ring Road, 4819.257 Sqm of land needs to be acquired. The Construction Cost of the Elevated Corridor is **Rs. 15223.75 Lakh** and the total Cost of the Project including Utility Shifting and Land Acquisition Cost is **Rs. 21404.00 Lakh** with 30 months as Implementation Period.

17.4 The Proposed Elevated Corridor Scheme along 100ft. Inner Ring Road by integrating Ejipura Main Road – Inner Ring Road Junction, Sony World Junction and Kendriya Sadana Junction after implementation would provide Better Flow to the to and fro Vehicular Traffic commuting between Ejipura Main Road – Inner Ring Road Junction and Hosur Road Junction near Kendriya Sadana along 100ft. Inner Ring Road with Improved Level of Service associated with Reduction in Vehicle Operation Cost (due to Improved Flow Conditions, Improved Speeds, Reduced Delays, Reduced Air and Noise Pollution). The Improvement Proposal would contribute significantly to Urban Transport Infrastructure Facility of Bangalore.

It is very important to preserve and maintain the Infrastructure created for the Corridor Improvement Proposals along 100ft. Inner Ring Road and Street Furniture in good / traffic worthy condition even after the Construction by Periodic and Routine Maintenance as per the Standard Practices to preserve the Precious Infrastructure Assets created.

As the Roads Revamping proposed under this Study would not be amenable to levy User Charges hence there would be no direct Revenue Generation from the Project. However, there would be significant Saving in both Fuel and Overall Cost to the Road Users that would indirectly increase the Vehicle Population and Economic Activities that add income to the Government.

The Clear Benefits that will be accrued due to the Proposed Elevated Corridor Scheme along 100ft. Inner Ring Road, Koramangala, Bangalore are as follows.

- Improved Traffic Flow along the Project Corridor.
- Improved Traffic Flow allowing greater Volume of Traffic at the Junctions at Grade Level covered by the Elevated Corridor.
- Reduced Congestion resulting in Improved Environment.
- Better Road Safety for all Users including Pedestrians.
- Good Road Conditions enabling Optimal Speed and Better Fuel Efficiency.
- Deterred unacceptable Road User Behavior.
- Saving in Travel Time.
- Reduced Vehicle Emissions and enhanced Air Quality.
- Saving in Vehicle Operation Cost.
- Improved Economic and Social Development.

The Estimation of User Benefits in terms of Time Savings and Vehicle Operating Cost Savings has been done as per IRC: SP – 30 "Manual on Economic Evaluation of Highway Projects in India". With the Implementation of Elevated Corridor Scheme, Benefits have been assessed by comparing the User Costs in the 'with' and 'without' Project Scenario. First year Benefit in the Post Elevated Corridor Scenario is **Rs. 6750.96 Lakh** with **31.48% IRR** at the end of year 2033. Hence it is viable to take up the Project.

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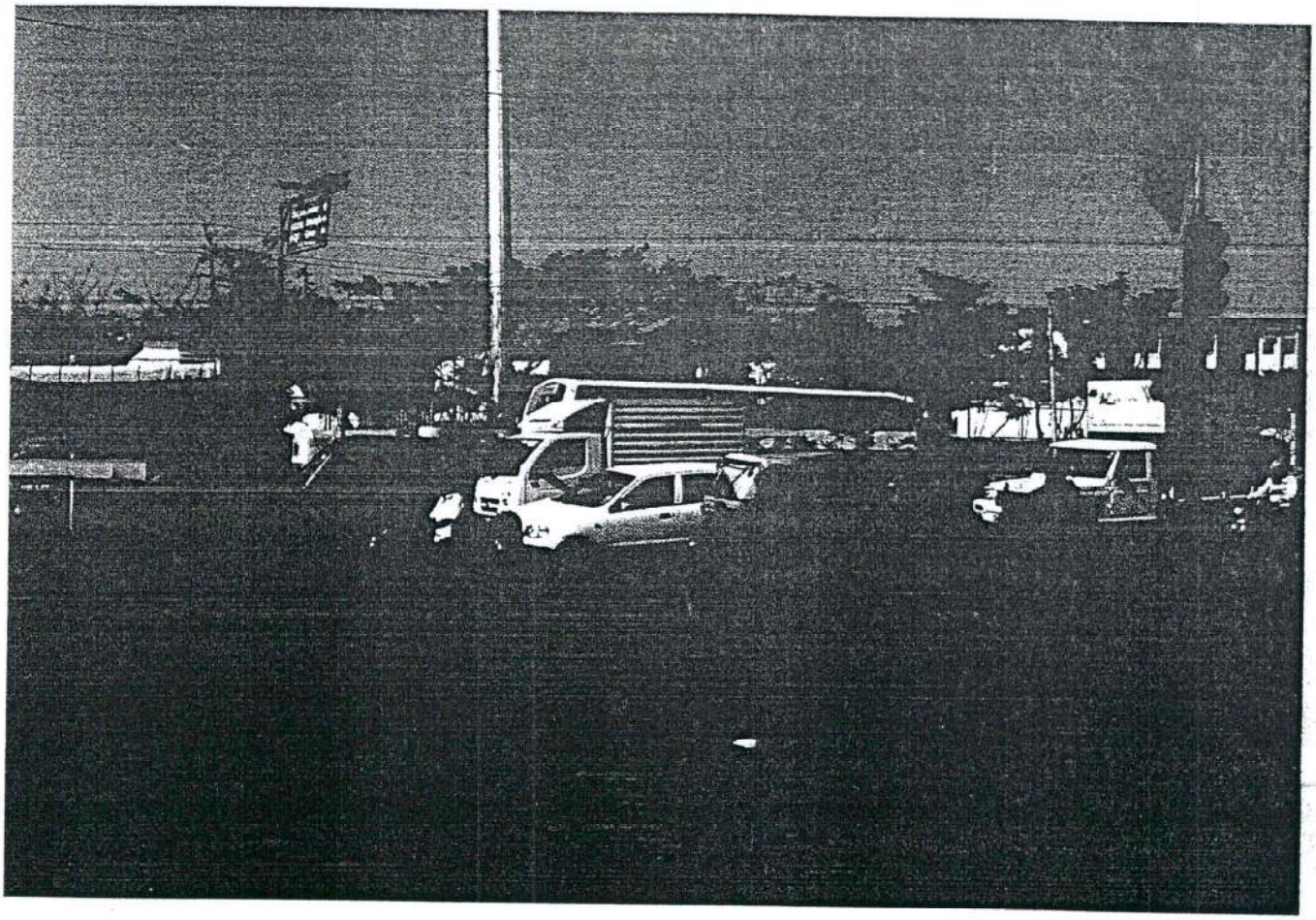
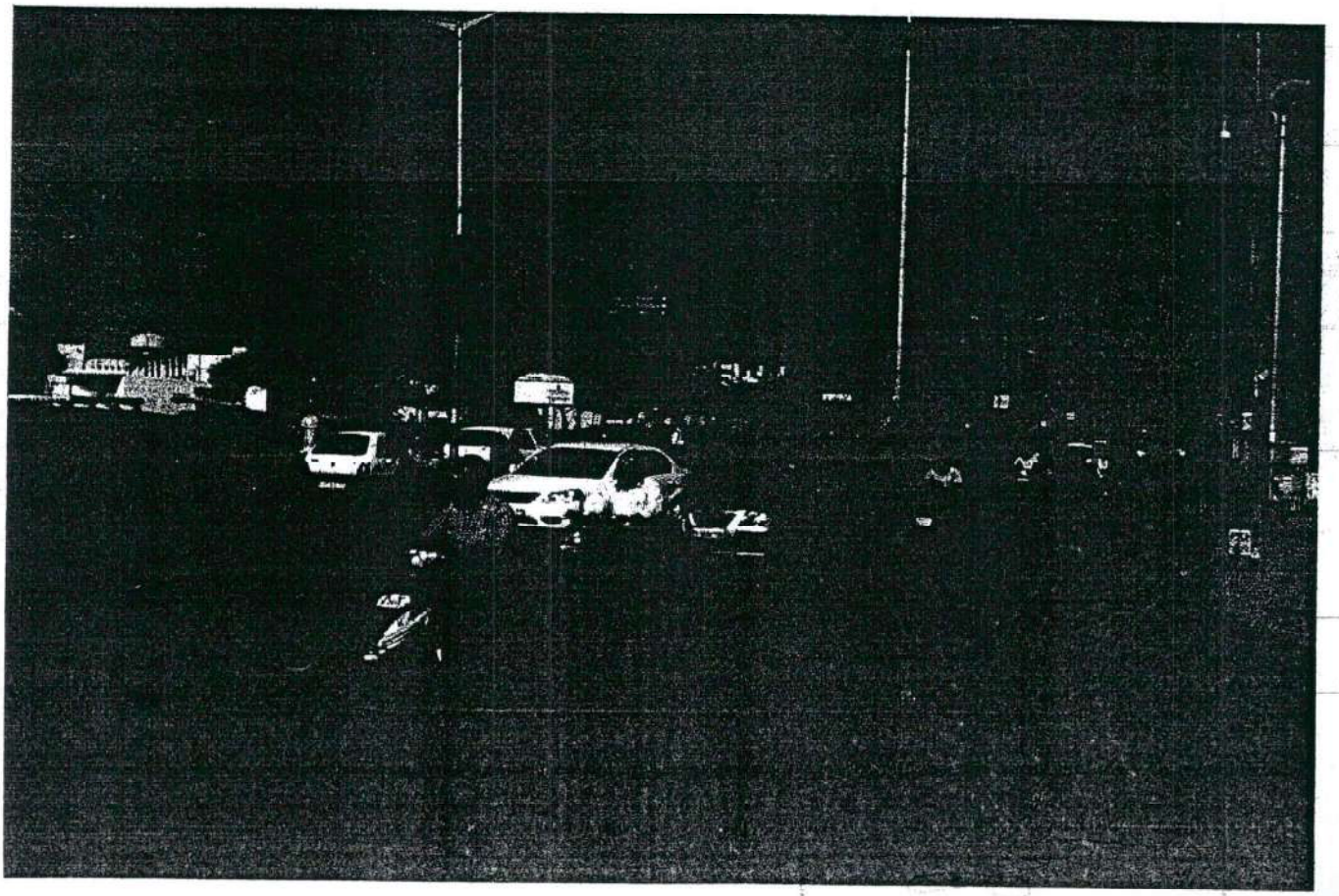
Chapter – 18

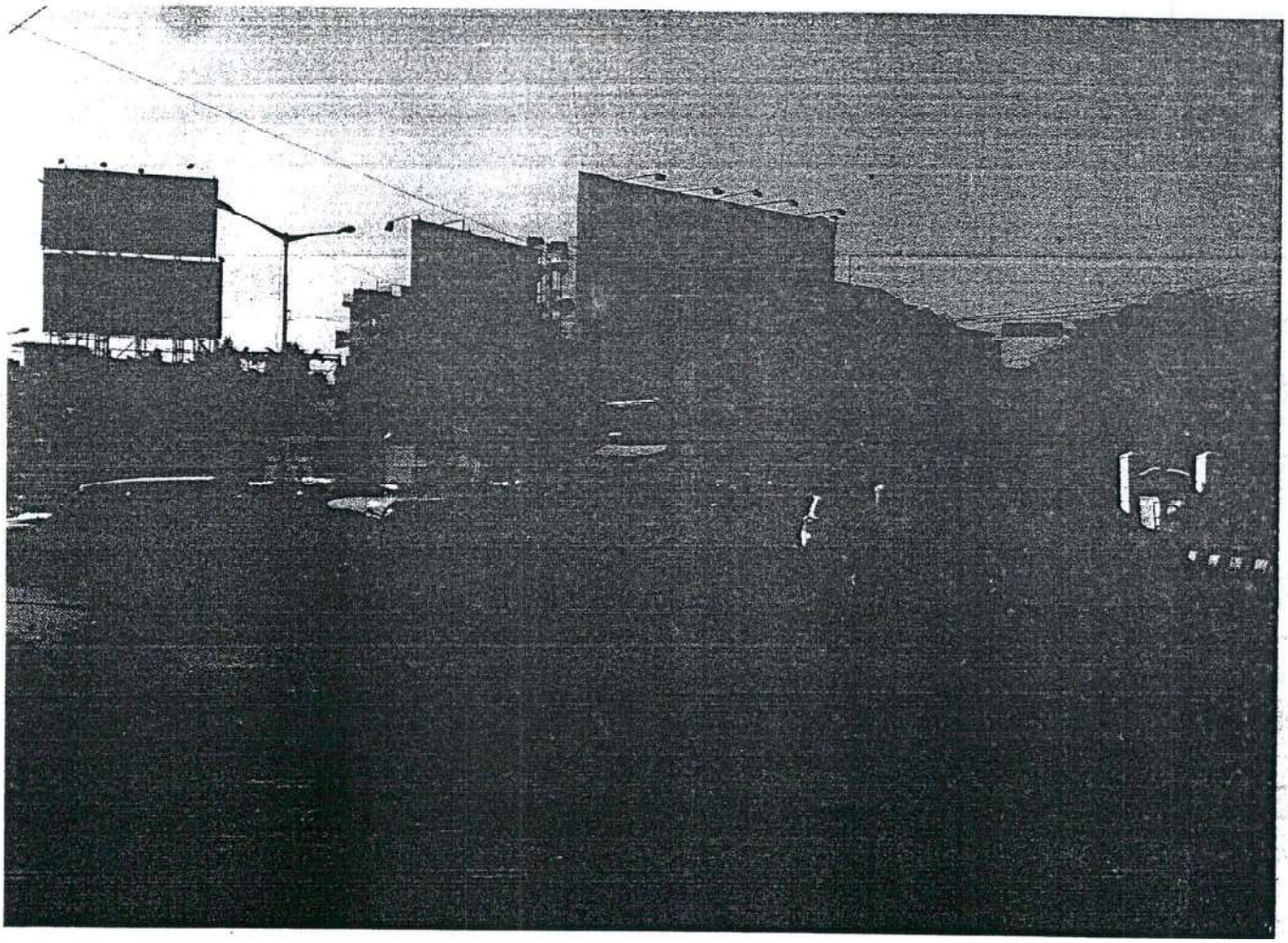
Photographs

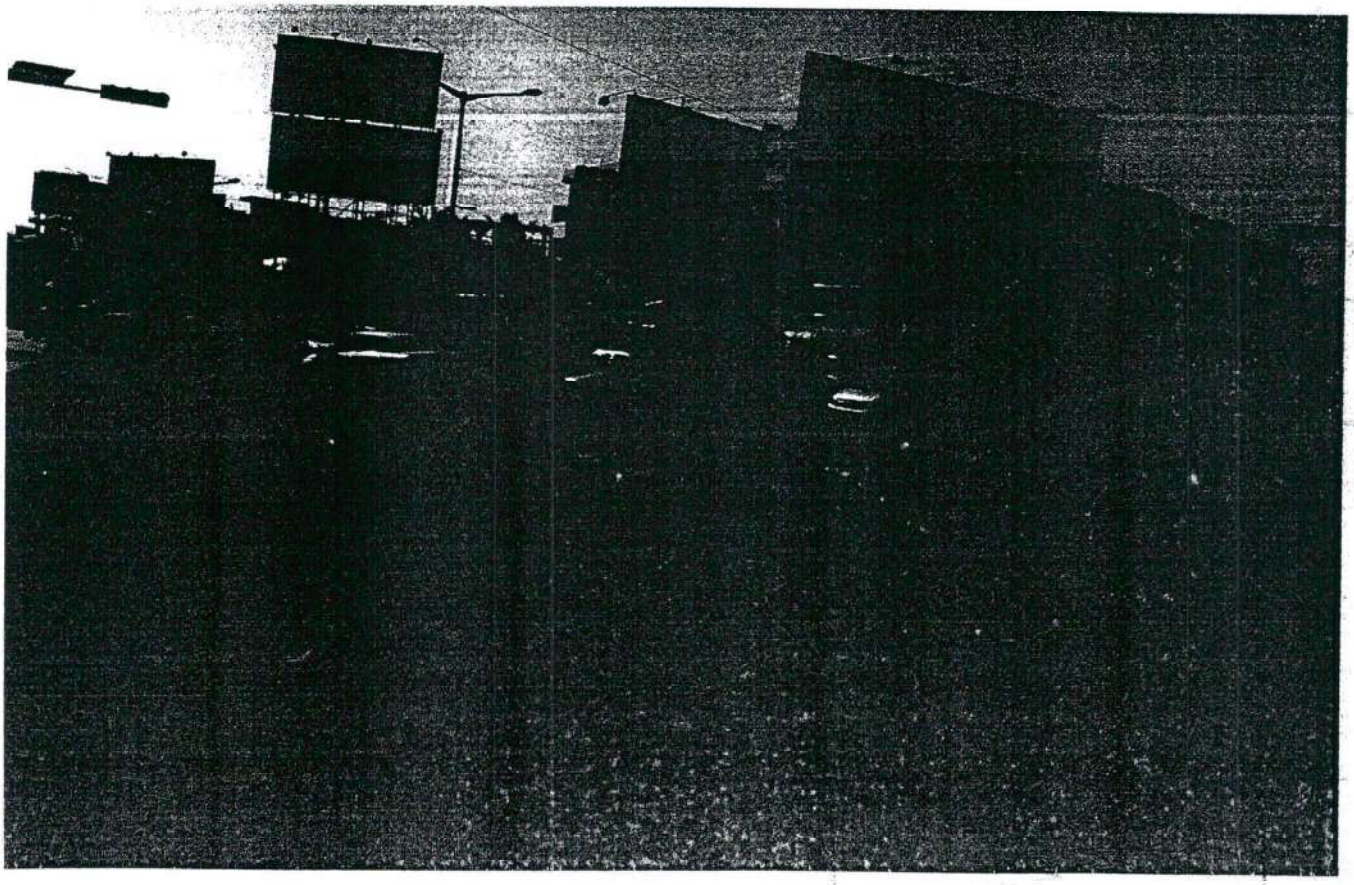
Existing Views of Project Corridor at Ejipura Main Road – Inner Ring Road Junction, Koramangala, Bangalore



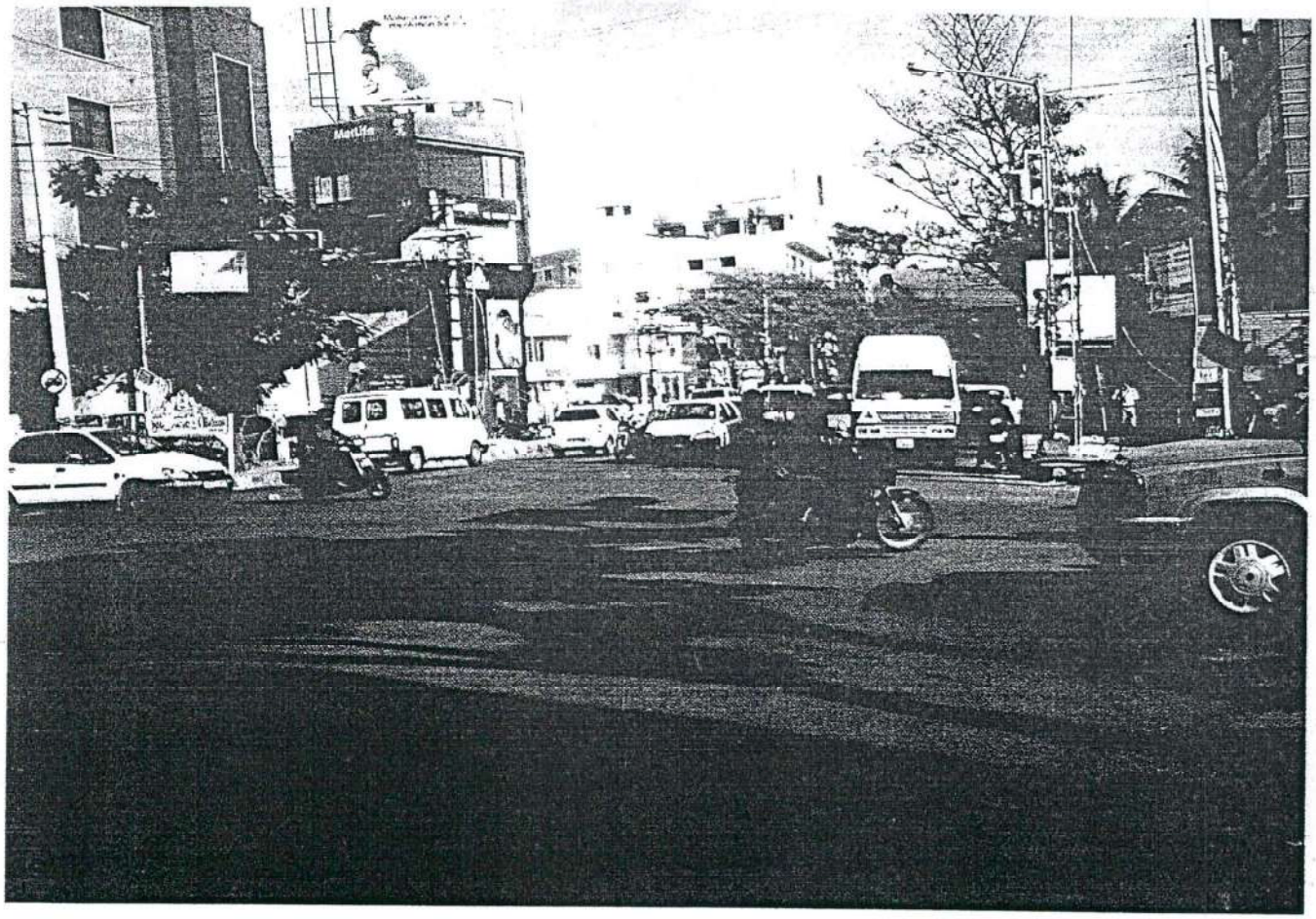


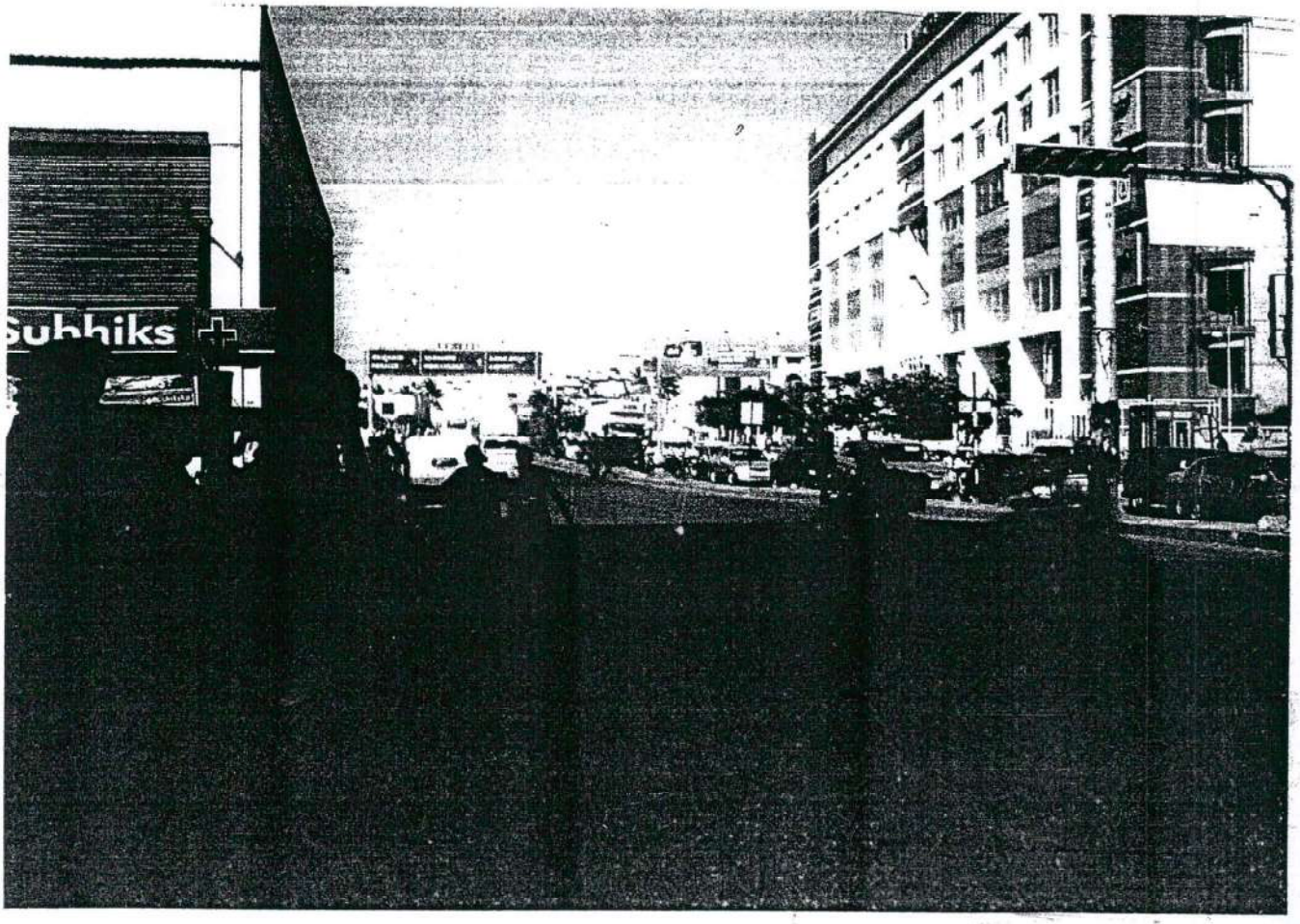
Existing Views of Project Corridor at Ejipura Main Road – Inner Ring Road Junction, Koramangala, Bangalore





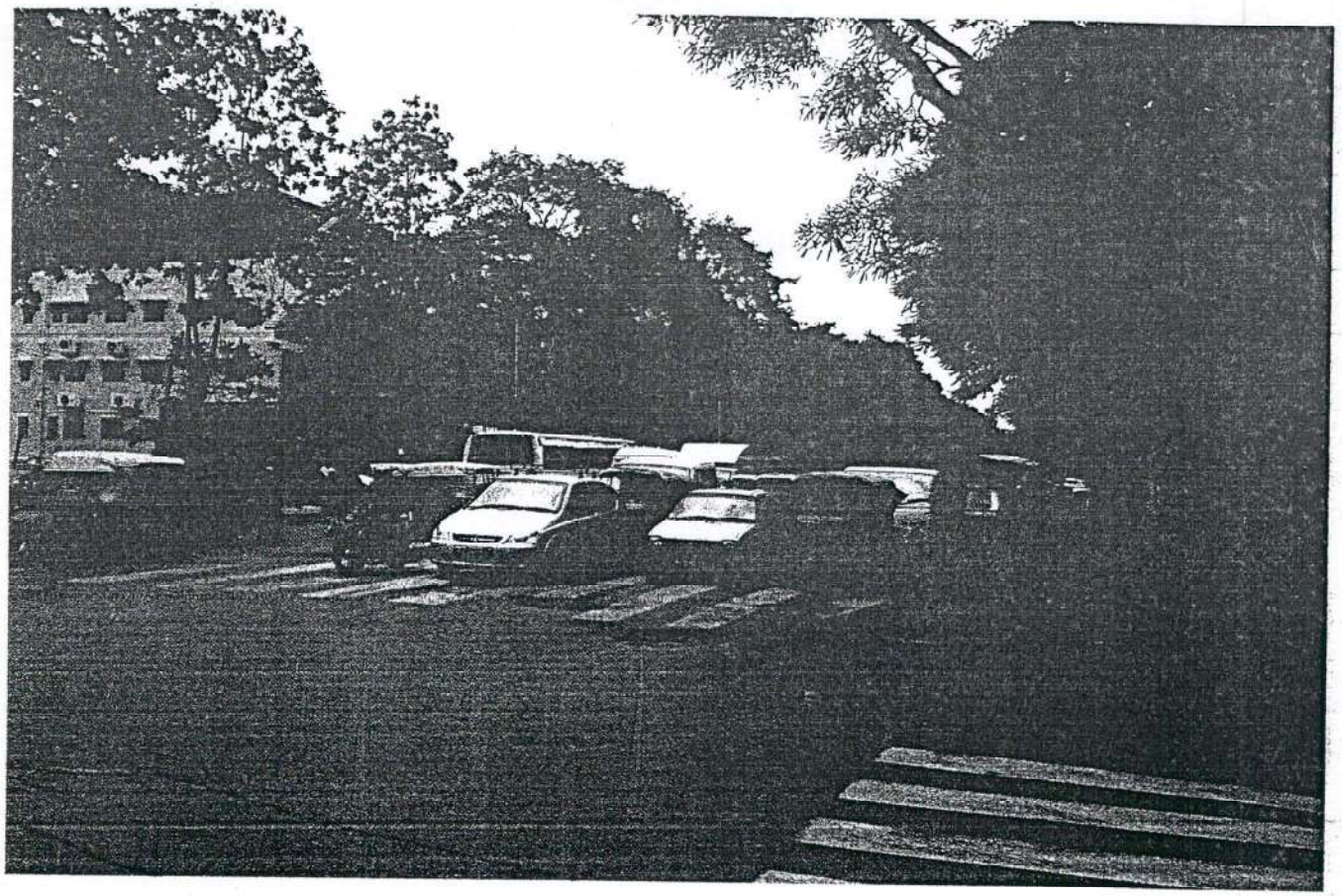
Existing Views of Project Corridor at Sony World Junction, Koramangala, Bangalore



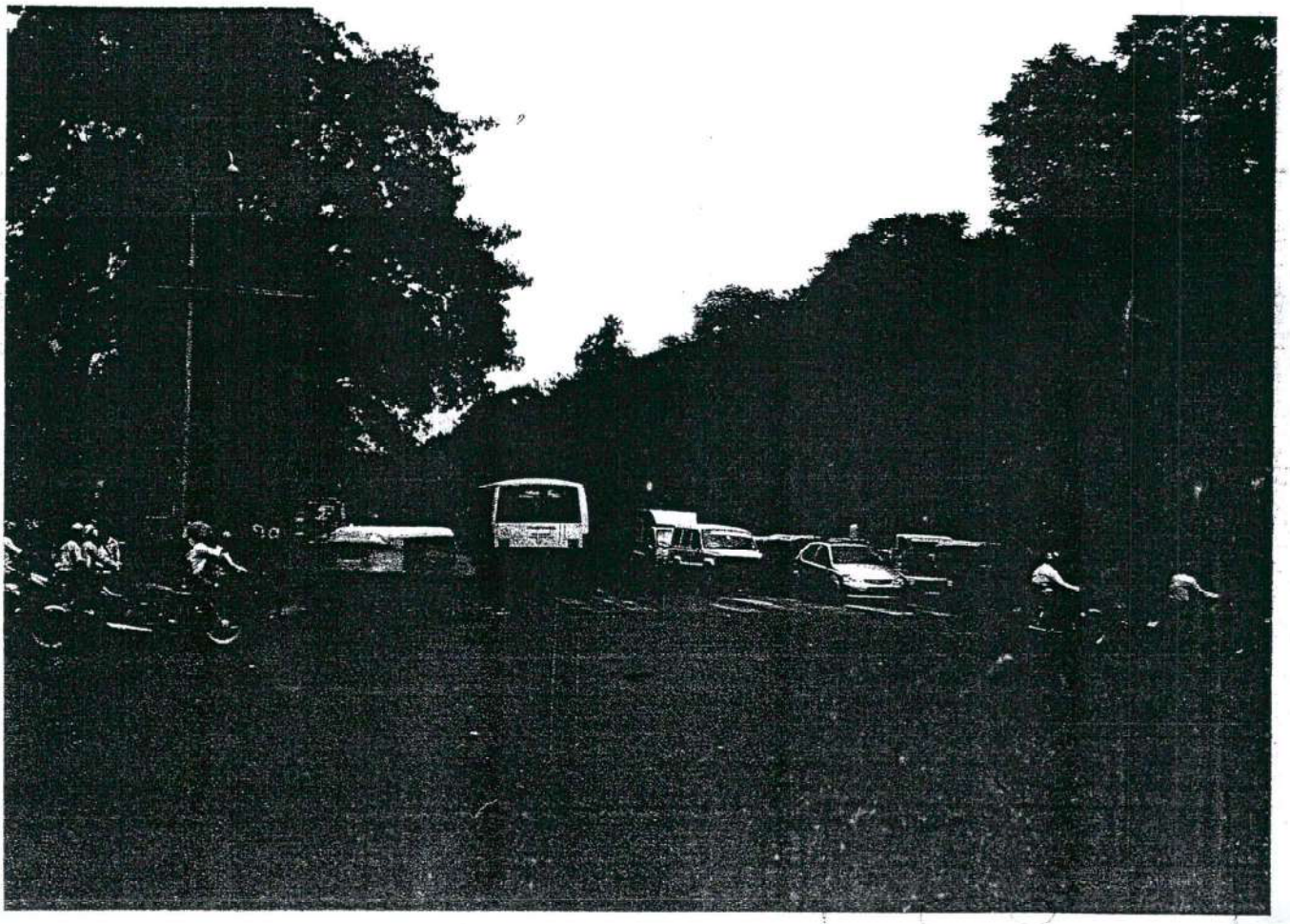


Existing Views of Project Corridor at Sony World Junction, Koramangala, Bangalore

Existing Views of Project Corridor at Kendriya Sadana Junction, Koramangala, Bangalore



Existing Views of Project Corridor at Kendriya Sadana Junction, Koramangala, Bangalore



Chapter – 19

Drawings