

Bicycle Friendly Streets in Jayanagar, Bangalore

A Report for Evolving Bicycle Friendly Street Network in Jayanagar, Bangalore.

The document notes the process for evolving bicycle friendly street network in Jayanagar, Bangalore. The Bicycle Friendly Streets are categorized into streets most suitable and moderately suitable for cycling. The critical junctions along the network are categorized as signalized intersections, non-signalized median open intersections and non-signalized median closed intersections. It has also identified the locations for signage and parking facilities. The document also notes the interventions required from Traffic Police and BBMP. The document concludes highlighting the role of RACF in creating awareness and motivating the user groups.



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Submitted to:

***Directorate of Urban Land Transport
Urban Development Department,
Government of Karnataka***

The efforts of Ride-A-Cycle Foundation in conceptualizing this initiative and support at various stages during the preparation of this report are gratefully acknowledged.

Introduction

Mobility forms an important aspect of any urban system. With rapid urbanization, fossil-fuel powered motor vehicles have seen significant rise in usage in the developing world causing concern on its sustainability. Contrary to the existing and conventional modes of transport, i.e., personalised motor transport (two-wheelers and four wheelers), intermediate public transport (taxis and auto-rickshaws), and public transport (buses), bicycles are the most practical and convenient alternatives for undertaking short trips apart from walking. As bicycles require little space and aid in reduction of greenhouse gas emissions they are gradually emerging as a viable mode for sustainable urban transport that abets not only in reducing congestion but also the automotive exhausts. The other advantage from bicycling is that they can serve as excellent alternative for last-mile-connectivity when facilitated at all the key mobility (transport) hubs, enriching the multimodal options for undertaking short trips.

The need for effective public transport and encouraging non-motorized transport has been never as important as it is today. The National Urban Transport Policy (NUTP) by the Government of India has already set the guiding principles for ensuring safe, convenient and sustainable transportation systems in cities. In order to realize one of the significant components of the policy, the Directorate of Urban Land Transport (DULT), Government of Karnataka has evinced a lot of interest in encouraging non-motorized transport especially for bicycles in cities.

The Ride-A-Cycle Foundation (RACF) is an active civil society organization pushing for reforms and initiatives to encourage cycling. RACF wants to encourage cycling as a form of recreation, sport and as a means to commute to work. Earlier, RACF had proposed to DULT for creating bicycle tracks around Madiwala Tank; create a network of bicycle routes in Jayanagar and Basavanagudi (Safe Route to Schools); and install bicycle parking stands in popular locations. DULT has already initiated the preparation of a pre-feasibility study for identifying the bicycle corridors around Madiwala Tank. The officials of DULT and members of RACF have been regularly interacting to discuss ways and means to encourage bicycling in the city.

Based on the proposal of 'Safe Route to Schools', it was decided that the officials of DULT and members of RACF would undertake a first-hand overview of the suggested bicycle paths along the existing streets of Jayanagar and Basavanagudi areas. Accordingly, a field visit was undertaken on 13th November 2010, where it was decided that a study would be commissioned for:

- a. Identifying a network of cycle routes in the proposed areas and prepare a network map with Schools / Colleges.
- b. Identifying and mark the conservancy lanes and the possibility of using them as cycle lanes.
- c. Identifying possible points of conflict.
- d. Identifying enforcement and development issues i.e., parking on roads, footpath re-engineering
- e. Evolving appropriate Signage
- f. Identifying list of residential welfare association etc for planning awareness campaign and also suggest framework for the campaign.

The Commissioner, DULT requested Gubbi Labs to prepare proposal for carrying out a study comprising the above objectives listed above. Gubbi Labs is a private research collective with strong

foundations in research and underpinnings of a social enterprise. The Labs, works on a host of domains ranging from sustainable ecosystems to livable settlements. The Labs is powered by a collective with interdisciplinary expertise and focus on research, development and consultancy. Gubbi Labs is working with Karnataka Road Transport Corporation (KSRTC) for introducing the Tumkur City Transport Service. The Labs also has an active project on evolving a Bicycle Sharing System for Indian cities besides other studies being undertaken on preparation of parking policy for 9 tier-II cities in Karnataka, studying the evolution of towns and cities, etc.

The primary goal of this initiative would be to: *Create bicycle friendly streets in certain localities of Bangalore in a phased manner to encourage cycling as a mode of safe, convenient and sustainable mode of urban transport.*

The document notes the process for evolving Bicycle Friendly Streets network in Jayanagar, Bangalore. The Consultants with active help of volunteers from Ride-A-Cycle Foundation have evolved the network that has categorized into streets as most suitable and moderately suitable for cycling. The subsequent section discusses the critical junctions identified and the interventions required therein by both BBMP and Traffic Police. In the next section, the locations of signage and parking facilities are listed. The document concludes highlighting the role of RACF in creating awareness and motivating the user groups.

Geographic Coverage

The initial proposal for Safe Route to Schools was to create a network of bicycle tracks in Jayanagar. However, based on the field visit and suggestions it was thought fit to create the network linking different parts of the city through this. Ultimately, it is hoped that there would be adequate tracks for bicycle users to commute from Makkala Koota (Chamarajapete) to Madiwala Tank (via Basavanagudi, Jayanagar, JP Nagar and BTM Layout). However, considering the intensity of tasks involved it was recommended that the identification of bicycle network shall be taken up in the following 3 phases:

- Phase 1: Jayanagar
- Phase 2: Basavanagudi
- Phase 3: JP Nagar – BTM Layout

Eventually, this has to be integrated with Madiwala Tank Cycle Project being taken up by DULT.

The entire task is proposed to be phased into 3 phases as indicated above. In the first phase, Jayanagar region will be the area of focus. This region used to be predominantly a residential locality interspersed with numerous educational institutions – schools and colleges. However, since the last decade the region has experienced significant transformations into mixed land-uses with the rise of commercial spaces. Yet, with the presence of numerous schools, colleges and coaching centers; this region potentially commands a significant number students in the catchment. Being one of the greenest localities in the city, the Jayanagar layout is interspersed with parks and playgrounds that attract people from all age groups. Thus, apart from the educational institutions, the parks and playgrounds are key destinations.

Methodology

The methodology for developing the regional bicycle network involves identifying where bicyclists begin their trips, the destinations they want to go to, and recommendations for the suitable routes that will get them there. The methodology also involves establishing minimum standards for streets where it is safer for bicycling. This will ensure that even the streets not on designated bicycle routes would have minimum accommodations for bicyclists.

The major bicycle user groups must be considered during the network development process and will be useful in the design of bicycle facilities. The bicycle user groups can be classified as follow (NRPC, 2005):

1. **Children:** Children are pre-teen riders whose use is initially monitored by parents. Eventually they are allowed independent access to the roadway system. They and their parents prefer access to key destinations – schools, surrounding residential areas, preferably on residential streets with low motor vehicle speed limits and volumes. They also prefer well-defined separation of bicycles and motor vehicles on arterial and collector streets or separated bike paths.
2. **Basic Bicyclist:** They are casual or new adult and teenage riders who are less confident of their ability to operate in traffic without provisions for bicyclists. Some will develop greater skills and progress to the advanced level, but there will always be millions of basic bicyclists. The basic bicyclist prefers comfortable and direct access to destinations, preferably on low-speed, low traffic-volume streets or designated bicycle facilities. They also prefer well-defined separation of bicycles and motor vehicles on arterial and collector streets or separated bike paths.
3. **Advanced Bicyclist:** These are experienced riders who can operate under most traffic conditions. Experienced bicyclists are best served by direct access to destinations via the existing street and highway systems as well as the opportunity to operate at maximum speed with minimum delays. They also prefer sufficient operating space on the roadway or shoulder to reduce the need for either the bicyclist or the motor vehicle operator to change position when passing.

The recommended bicycle network should primarily accommodate and encourage Children and Basic Bicyclist. Advanced Bicyclist will benefit from this network, as well as the establishment of the minimum road design standards mentioned earlier. The methodology for identifying suitable routes is therefore similar for all design groups.

Network Development Methodology

NRPC (2005) has developed a methodology for identifying the routes that should be recommended for inclusion in the region-wide bicycle network, which is adapted for the current scenario. The steps described below assume that demand for bicycle facilities is influenced by the location, type, and intensity of land-use throughout the region as well as by the distribution of population. Factors such as directness, barriers, aesthetics and cost of improvements will also be considered. The following six steps were used to develop the bicycle network:

1. Identify and Quantify Trip Productions.
2. Identify and Quantify Trip Attractions.

3. Identify Desired Bicycle Travel Corridors.
4. Apply Suitability Index to Select Alternative Routes.
5. Evaluate Route Alternatives Using Performance Criteria.
6. Identify Recommended Activities.

The trip productions or the origins of the trips typically originate at the rider's place of residence. Destinations would be schools, recreation areas, retail business, etc. that are considered as trip attractions. In this case, the first intended users are the school going children and hence all the schools, colleges, coaching centers, parks and playgrounds will be identified in the region. The desired bicycle corridors should connect the zones that generate a significant number of bicycle trips with the zones that attract a significant number of bicycle trips. It is assumed that people on bicycles want to go to the same places as do people in cars, within the constraints imposed by distance, and that the existing system of streets reflects the existing travel demands. Desirable travel corridors therefore may be well represented by the traffic flow on the existing road system. It is true, however, that travel patterns of less experienced riders are influenced by their perception of the bicycling environment they face. Uncomfortable or threatening conditions will cause these bicyclists to alter their choice of route from the most preferred alignment (USDOT, 2010). It is therefore important to consider where bicyclists would ideally ride if they could go where they preferred because those ideal routes may not be the same as the routes that bicyclists currently use (NRPC, 2005).

Bicyclists will ride on what they perceive to be "suitable" routes. The road network data part of the geospatial database with attributes of road width, traffic volumes, pavement conditions, etc. were used to assess the suitability.

From the analysis, the possible points of conflicts along streets or at junctions were identified. Thereafter, the necessary mechanisms to negotiate them are detailed. Further, based on the assessment, it has been observed that there are some issues for the movement of bicycles like: Encroachment / maintenance of conservancy lanes; Parking of vehicles on footpaths / lanes; and Dumping of garbage on the footpath. Therefore, based on the assessment along the identified network, these issues will be noted and suitable measures to deal with them are detailed.

The next task then is to ensure that the identified routes are known to users. Hence, there has to be signage with network maps prepared and locations to install them are recommended. Additionally, it is most important to install appropriate signage all along then network based on suitability of bicycle friendly streets (most suitable or moderately suitable). Alongside, noting the importance of user-participation in the network planning process, educational institutions (schools, colleges and coaching centres) have been approached by the RAC-F. The list of educational institutions in the region is listed below.

Table 1: List of Prominent Educational Institutions in Jayanagar.

Sl No	Name	Type of Institution
1	BES HS	School
2	BHS HS School	School
3	Carmel Convent School	School
4	Ganapathi Vidyamandira HS	School
5	Geetha HPS	School
6	GHPS Jayanagar	School
7	GHPS Tilak Nagar	School
8	Good Shepard School	School
9	Holy Christ HPS	School
10	Holy Saint HPS	School
11	JSS HS	School
12	MES HS	School
13	New Holy Cross School	School
14	NSVK EHPS	School
15	NSVK Kannada School	School
16	Rani Saraladevi HPS	School
17	Sri Ram Vidyalaya	School
18	Tilaknagar HPS	School
19	Vijaya High School	School
20	Vivekananda HPS	School
21	NMKRV College	College
22	Surana College	College
23	Vijaya PU College	College
24	BHS First Grade College and PU College	College
25	National College Jayanagar	College
26	City College	College
27	SSMRV College	College
28	RV Dental College	College
29	RV Teachers College	College
30	BES Educaitonal Institutions	College
31	NIIT Jayanagar Centre	Coaching Centre
32	Rao's Coaching Centre	Coaching Centre

The residential welfare associations (RWA) have to be approached to encourage user participation. It is important to mobilize local support by way of involving the residential welfare associations during planning and taking up the awareness campaign. Hence, the details of key residential welfare associations in the region and the concerned persons' contact details are listed below.

1. Jayanagar Cultural and Civic Association
33rd Cross, 9th Main, 4th Block,
Jayanagar. Ph: 2634-3952/53.

2. Residents Welfare Association
598, 11th Main, 5th Block,
Jayanagar.
Contact Persons: Dr Surendra (Ph: 2663-5466), Mr Vasudeva Reddy (Ph: 2663-5308).
3. LIC/Canara Bank Colony/ Hanumanthappa Layout Residents Welfare Association
92, 1st Cross, LIC Colony,
3rd Block, Jayanagar East.
Contact Persons: Mr T N Kumarasan (Ph: 2663-3319), Ms Nalinakshi Sannappa (Ph: 2663-1339).
4. Shreyas,
1414, South End 'A' Road,
9th Block, Jayanagar.
Contact Persons: Mr Kamath (Ph: 2658-8865), Mr Ananda Rao (Ph: 2658-8132).
5. B L G Rao
Co-ordinator, FORCE,
17/A, 3rd Cross, 1st Block, Jayanagar, Bangalore - 560 011
Tel: 26564014
6. Jayanagar 5th Block Residents Welfare Association
119, 7th Main, 5th Block, Jayanagar, Bangalore - 560 041
Tel: 265544155
7. K V Bhaskar Murthy
President, Federation of Jayanagar Residents Association,
245, 6th Main Road, 4th Block, Jayanagar, Bangalore - 560 011
Tel: 9448136714

Network Identification

As noted in the section on Network Development Methodology, the trip production was assumed to be generated in the entire region. However, the key destinations were assumed to be all the prominent educational institutions. Hence, as a first step, the locations of these institutions were mapped on to the network map. The Consultants based on the suitability of the streets in the network for cycling and with the active help of volunteers from Ride-A-Cycle Foundation have evolved the network that has been categorized into streets as *most suitable* and *moderately suitable* for cycling. The Network Map thus identified is shown in Figure 1.

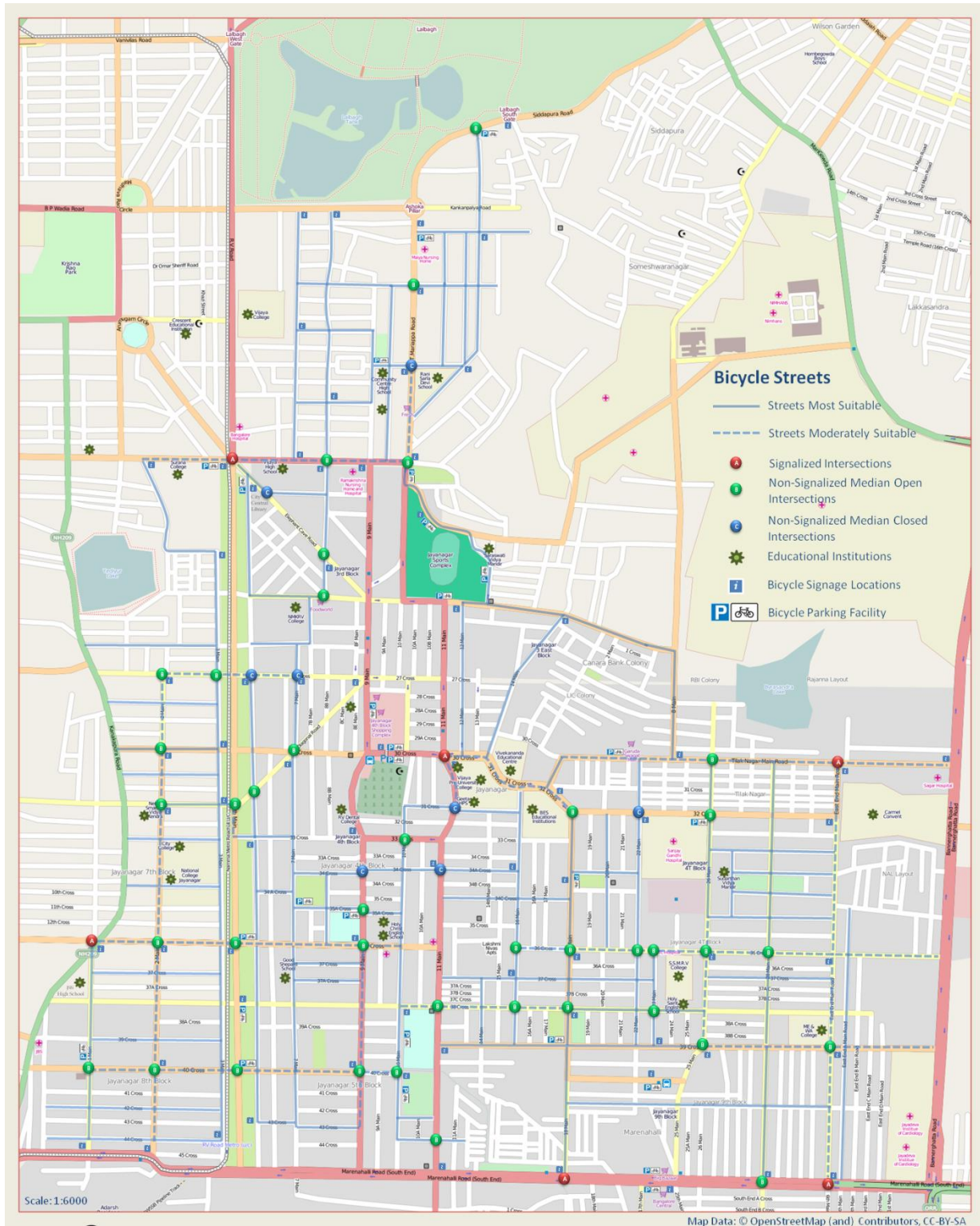


Figure 1: Network Map with Parking and Signage Locations.

Critical Intersections

Once the network of streets was identified the subsequent task was to assess the impact on commuting and negotiating along the intersections in the network. The rapid assessment of the critical intersections in the network was undertaken for the following parameters:

1. Type of Intersection
2. Presence of Traffic Signal
3. Prevalence of Median (Open or Closed)
4. Availability of Pedestrian Crossing
5. Prevalence of On-street Parking

Annexure A provides the details of this assessment. Based on the analysis, the critical junctions along the network are categorized as:

- Signalized intersections (6);
- Non-signalized median open intersections (42) and
- Non-signalized median closed intersections (8).

Analysing the intersections for the above categories, certain measures were identified to resolve conflicts in these junctions. Accordingly, separate treatments are recommended for each category. The details of proposed treatment are listed in Annexure B. Broadly, the specific interventions to be undertaken by BBMP and Traffic Police are as follows:

BBMP

- Marking of Bicycle Lanes (including bicycle stencil marking) for 100 m from all categories of intersections identified
- Construction of Raised Pedestrian Crossing at all the intersections identified (Annexure B)
- Clearance of Carriageway at certain locations identified (Annexure C)
- Installation of Signage: Informatory, Cautionary and Mandatory, at all locations identified (Annexure B)
- Installation of Informatory Signage with the Network Map at prominent locations identified including all schools and colleges in the region (Figure 1 and Annexure E)
- Installation of Bicycle Parking Facility (Stands) at all the locations identified (Figure 1 and Annexure F)

Traffic Police

- Enforcement of No-Parking Zones (Annexure D)
- Installation of Traffic Signal at 7th Main – 30th Cross intersection (Figure 1)
- Synchronizing Signal phases for Non-Motorized Transport crossings (Annexure B)

Summary and Conclusion

The report identified the Bicycle Friendly Streets categorizing them as *Most Suitable* and *Moderately Suitable* in Jayanagar, Bangalore. Further, with a view to negotiate the critical junctions along the network, these are categorized as signalized intersections, non-signalized median open intersections and non-signalized median closed intersections. It has also identified the locations for signage and parking facilities. The interventions required from Traffic Police and BBMP are critical in successful

implementation and realization of the project goals. Furthermore, it is most essential that the active user groups – the school students and residents of Jayanagar are sensitized and adequate awareness of this initiative is provided. In this context the role of Ride-A-Cycle Foundation in creating awareness and motivating the user groups is going to be most important. One of the important aspects of this initiative is the simplicity of interventions proposed and it is hoped that these would prove beneficial for bicycle commuting. In conclusion, with the dedicated efforts of DULT the initiative has reached this stage. As a next step, it is imperative that the respective agencies: BBMP and Traffic Police concur to the proposals made and take it forward for its implementation. Only then, we can realize the Bicycle Friendly Streets in Jayanagar, Bangalore. It has to be noted that while this is a pilot initiative, the success and learnings from this has to be documented so as to scale up and replicate this in other localities and tier-II cities of the state.

References

1. NRPC, 2005. *Regional Bicycle and Pedestrian Plan - Appendix A: Bicycle Network Development*. Nashua Regional Planning Commission.
2. USDOT, 2010. *Bicycle and Pedestrian Planning Overview*, Federal Highway Administration, US Department of Transportation.

Annexures

Bicycle Friendly Streets in Jayanagar, Bangalore | 2010

Annexure A: Intersections

ID	Intersection Name	Type of Intersection	Main	Cross	Traffic Signal (Y/N)	Median (Open / Close)	Pedestrian Crossing (Y/N)	On-street parking	Pavements-Sidewalks (Y/N)
1	JSS Circle	Multileg	1st Main	36th Cross	YES	OPEN	YES	NO	YES
2	1st Main / 40th Cross	Four Leg	1st Main	40th Cross	NO	OPEN	NO	YES	YES
3	2nd Main / 27th Cross	Three Leg	2nd Main	27th Cross	NO	OPEN	YES	NO	YES
4	2nd Main / 30th Cross	Four Leg	2nd Main	30th Cross	NO	OPEN	NO	NO	YES
5	2nd Main / 32nd Cross	Four Leg	2nd Main	32nd Cross	NO	OPEN	NO	NO	YES
6	2nd Main / 36th Cross	Four Leg	2nd Main	36th Cross	NO	OPEN	YES	NO	YES
7	2nd Main / 40th Cross	Four Leg	2nd Main	40th Cross	NO	OPEN	NO	NO	YES
8	3rd Main / 27th Cross	Four Leg	3rd Main	27th Cross	NO	CLOSED	NO	NO	YES
9	South End Circle	Multileg	RV Road	South End Road	YES	OPEN	YES	NO	YES
10	4th Main / 32nd Cross	Four Leg	4th Main	32nd Cross	NO	OPEN	NO	NO	YES
11	4th Main / 36th Cross	Four Leg	4th Main	36th Cross	NO	OPEN	YES	NO	YES
12	4th Main / 40th Cross	Four Leg	4th Main	40th Cross	NO	OPEN	YES	NO	YES
13	5th Main / 27th Cross	Four Leg	5th Main	27th Cross	NO	OPEN	NO	NO	YES
14	5th Main / Diagonal Road	Four Leg	5th Main	Diagonal Road	NO	OPEN	NO	NO	YES
15	7th Main / 27th Cross	Four Leg	7th Main	27th Cross	NO	CLOSED	NO	NO	YES
16	7th Main / 30th Cross	Multileg	7th Main	30th Cross	NO	OPEN	YES	YES	YES
17	8th Main / South End Road	Three Leg	8th Main	South End Road	NO	OPEN	YES	NO	YES
18	8th Main / Elephant Rock Road	Four Leg	8th Main	Elephant Rock Road	NO	OPEN	YES	NO	YES
19	8th Main / 22nd Cross	Three Leg	8th Main	22nd Cross	NO	OPEN	NO	NO	YES
20	9th Main / 34th Cross	Four Leg	9th Main	34th Cross	NO	CLOSED	NO	NO	YES
21	9th Main / 35 A Cross	Four Leg	9th Main	35 A Cross	NO	OPEN	NO	NO	YES
22	9th Main / 36th Cross	Four Leg	9th Main	36th Cross	NO	OPEN	YES	NO	YES
23	9th Main / 40th Cross	Four Leg	9th Main	40th Cross	NO	OPEN	YES	NO	YES

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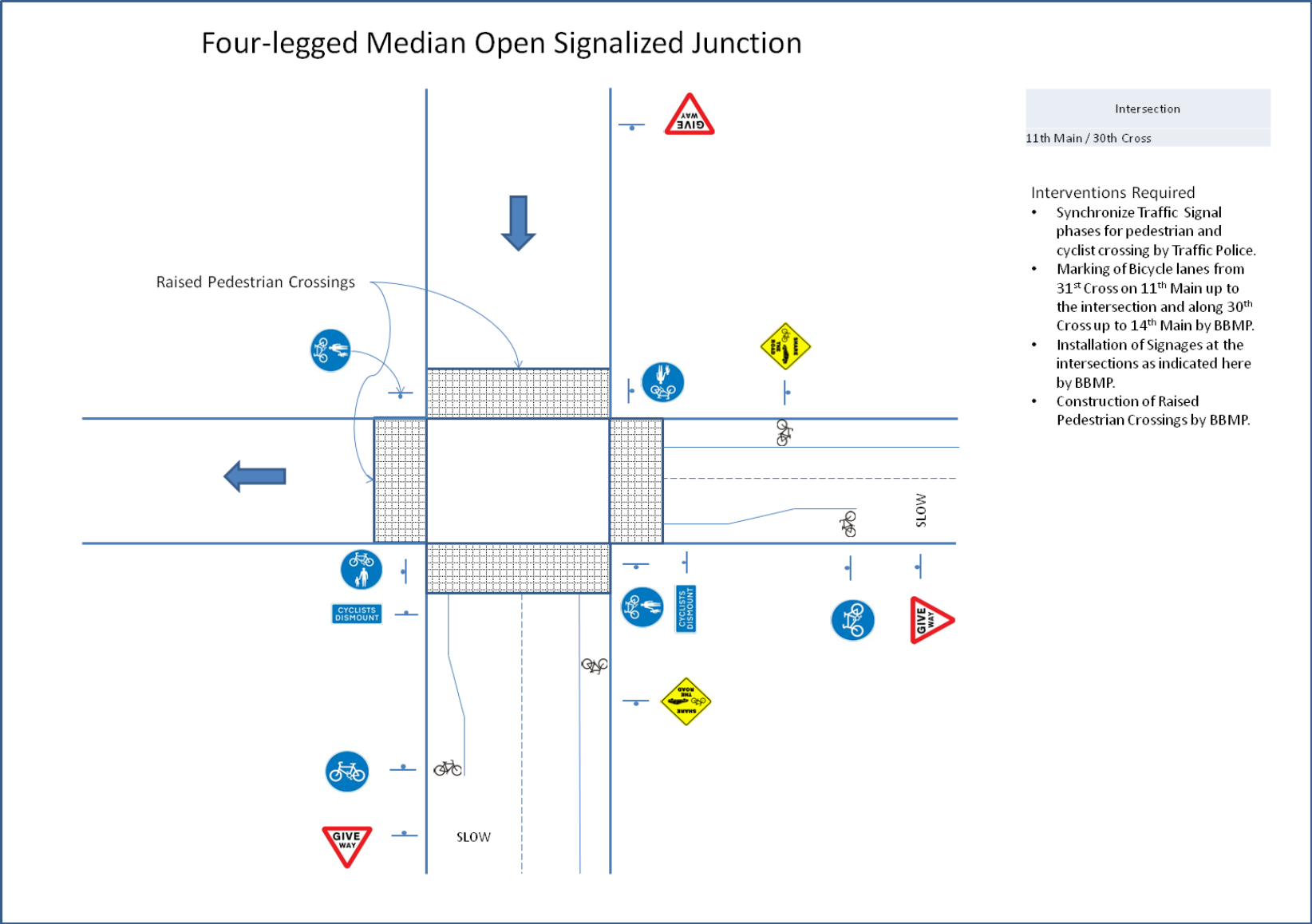
ID	Intersection Name	Type of Intersection	Main	Cross	Traffic Signal (Y/N)	Median (Open / Close)	Pedestrian Crossing (Y/N)	On-street parking	Pavements-Sidewalks (Y/N)
24	10th Main / 4th Cross	Four Leg	10th Main	4th Cross	NO	OPEN	YES	NO	YES
25	10th Main / 9th Cross	Four Leg	10th Main	9th Cross	NO	CLOSED	YES	NO	YES
26	10th Main / South End Road	Four Leg	10th Main	South End Road	NO	OPEN	YES	NO	YES
27	10th Main / 33rd Cross	Four Leg	10th Main	33rd Cross	NO	OPEN	NO	NO	YES
28	10th Main / 40th Cross	Three Leg	10th Main	40th Cross	NO	OPEN	NO	NO	YES
29	10 C Main / Siddapura Main Road	Three Leg	10 C Main	Siddapura Main Road	NO	OPEN	NO	NO	YES
30	11th Main / 30th Cross	Four Leg	11th Main	30th Cross	YES	OPEN	YES	YES	YES
31	11th Main / 31st Cross	Four Leg	11th Main	31st Cross	NO	CLOSED	NO	NO	YES
32	11th Main / 34th Cross	Four Leg	11th Main	34th Cross	NO	CLOSED	NO	NO	YES
33	11th Main / 38th Cross	Four Leg	11th Main	38th Cross	NO	OPEN	YES	YES	YES
34	11th Main / 17th Cross	Four Leg	11th Main	17th Cross	NO	OPEN	NO	NO	YES
35	16th Main / 36th Cross	Three Leg	16th Main	36th Cross	NO	OPEN	NO	NO	YES
36	16th Main / 38th Cross	Four Leg	16th Main	38th Cross	NO	OPEN	NO	NO	YES
37	18th Main / 32nd Cross	Three Leg	18th Main	32nd Cross	NO	OPEN	NO	NO	YES
38	18th Main / 36th Cross	Four Leg	18th Main	36th Cross	NO	OPEN	NO	NO	YES
39	18th Main / 38th Cross	Four Leg	18th Main	38th Cross	NO	OPEN	NO	NO	YES
40	18th Main / 39th Cross	Four Leg	18th Main	39th Cross	NO	OPEN	NO	NO	YES
41	18th Main / 45th Cross	Three Leg	18th Main	45th Cross	YES	OPEN	YES	YES	YES
42	22nd Main / 32nd Cross	Four Leg	22nd Main	32nd Cross	NO	CLOSED	NO	NO	YES
43	23rd Main / 36th Cross	Three Leg	23rd Main	36th Cross	NO	OPEN	NO	NO	YES
44	23rd Main / 38th Cross	Four Leg	23rd Main	38th Cross	NO	OPEN	NO	NO	YES
45	26th Main / Tilak Nagar Main Road	Four Leg	26th Main	Tilak Nagar Main Road	NO	OPEN	NO	NO	YES
46	26th Main / 32nd Cross	Four Leg	26th Main	32nd Cross	NO	OPEN	NO	NO	YES
47	26th Main / 36th Cross	Four Leg	26th Main	36th Cross	NO	OPEN	NO	NO	YES
48	26th Main / 39th Cross	Four Leg	26th Main	39th Cross	NO	OPEN	NO	NO	YES

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ID	Intersection Name	Type of Intersection	Main	Cross	Traffic Signal (Y/N)	Median (Open / Close)	Pedestrian Crossing (Y/N)	On-street parking	Pavements-Sidewalks (Y/N)
49	28th Main / 36th Cross	Four Leg	28th Main	36th Cross	NO	OPEN	NO	NO	YES
50	28th Main / 39th Cross	Four Leg	28th Main	39th Cross	NO	OPEN	NO	NO	YES
51	28th Main / 45th Cross	Four Leg	28th Main	45th Cross	NO	OPEN	YES	NO	YES
52	East End Main / Tilak Nagar Main Road	Three Leg	East End Main	Tilak Nagar Main Road	YES	OPEN	YES	NO	YES
53	East End Main / 36th Cross	Four Leg	East End Main	36th Cross	NO	OPEN	YES	NO	YES
54	East End Main / 39th Cross	Four Leg	East End Main	39th Cross	NO	OPEN	NO	NO	YES
55	East End Main Road / 45th Cross	Four Leg	East End Main	45th Cross	YES	OPEN	YES	YES	YES
56	Elephant Rock Road	Three Leg	Elephant Rock (Diagonal) Road	16th Cross	NO	CLOSED	NO	NO	YES

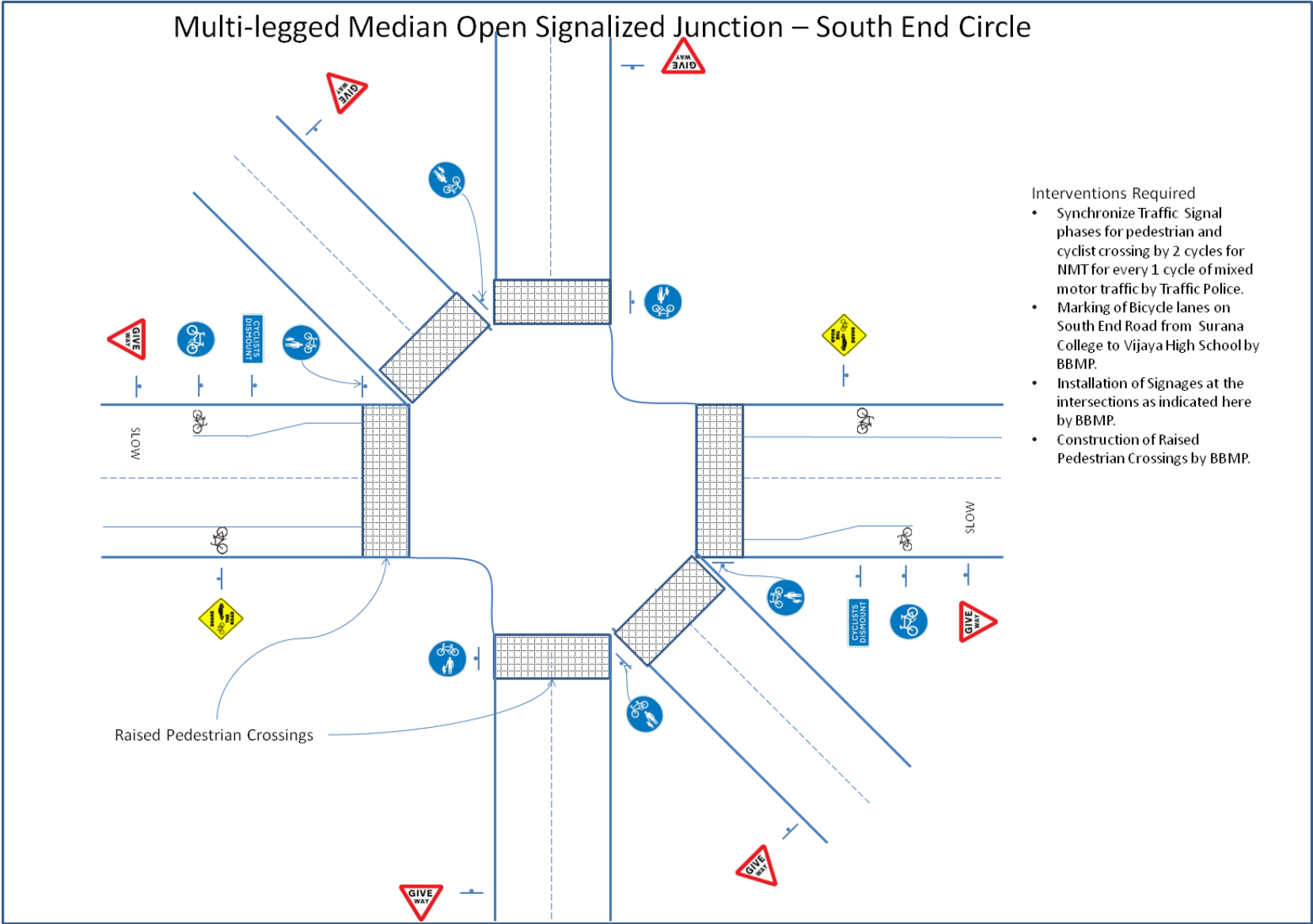
Annexure B: Conceptual Designs of Interventions required in different intersections.

Four-legged Median Open Signalized Junction

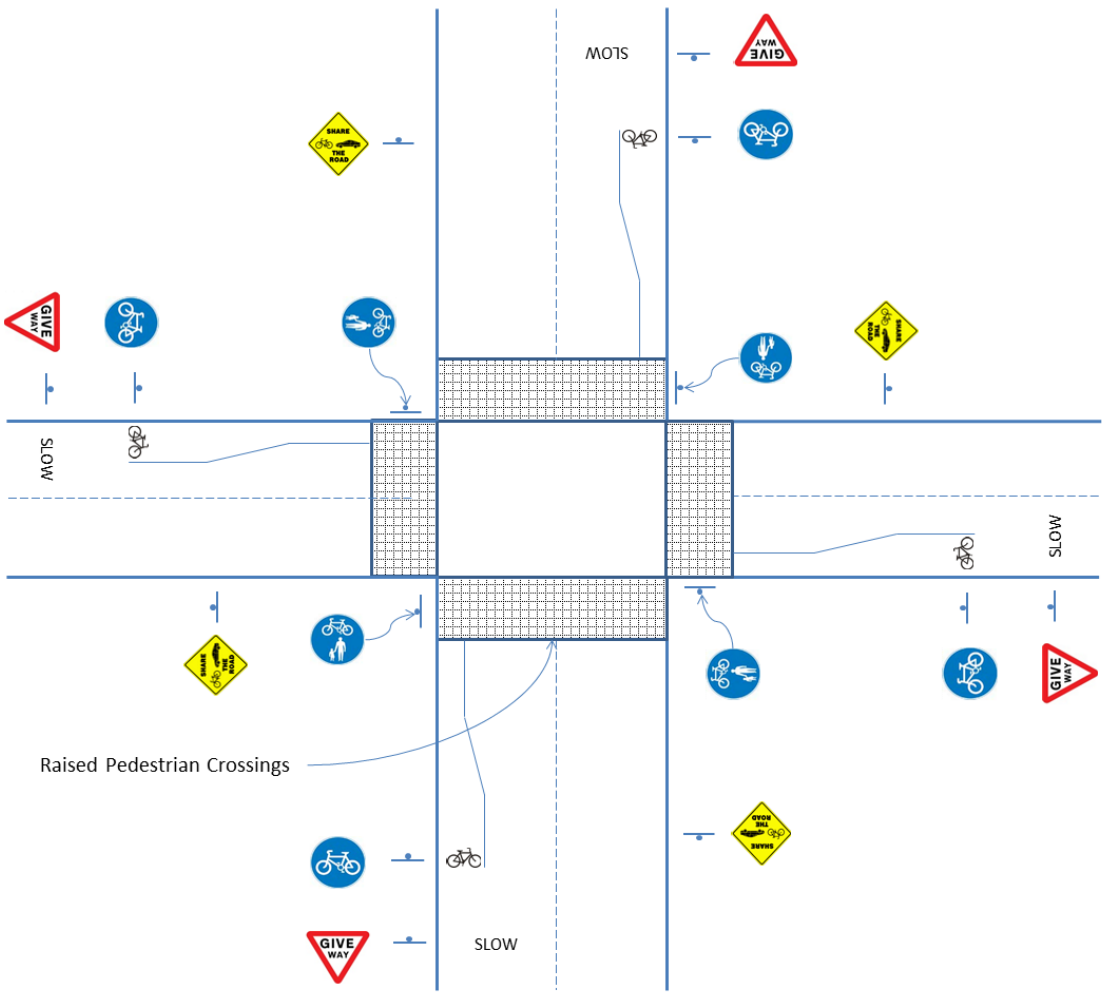


Intersection
11th Main / 30th Cross

- Interventions Required
- Synchronize Traffic Signal phases for pedestrian and cyclist crossing by Traffic Police.
 - Marking of Bicycle lanes from 31st Cross on 11th Main up to the intersection and along 30th Cross up to 14th Main by BBMP.
 - Installation of Signages at the intersections as indicated here by BBMP.
 - Construction of Raised Pedestrian Crossings by BBMP.



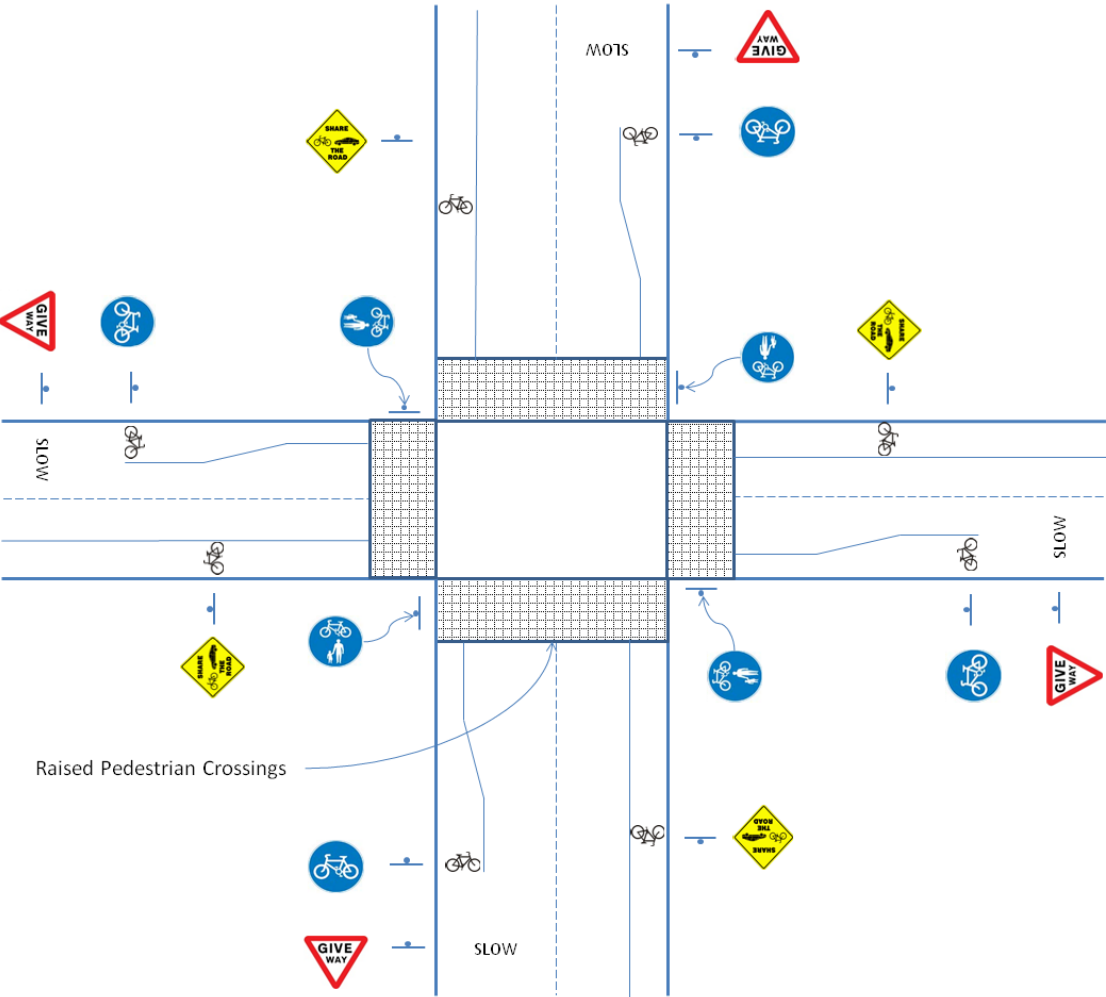
Four-legged Median Open Non-Signalized Junctions



Intersections
1st Main / 40th Cross
2nd Main / 30th Cross
2nd Main / 32nd Cross
2nd Main / 36th Cross
2nd Main / 40th Cross
4th Main / 32nd Cross
4th Main / 36th Cross
4th Main / 40th Cross
5th Main / 27th Cross
5th Main / Diagonal Road
8th Main / Elephant Rock Road
9th Main / 35 A Cross
9th Main / 36th Cross
9th Main / 40th Cross
10th Main / 4th Cross
10th Main / South End Road
10th Main / 33rd Cross
11th Main / 38th Cross
11th Main / 17th Cross
16th Main / 38th Cross
18th Main / 36th Cross
18th Main / 38th Cross
18th Main / 39th Cross
23rd Main / 38th Cross
26th Main / Tilak Nagar Main Road
26th Main / 32nd Cross
26th Main / 36th Cross
26th Main / 39th Cross
28th Main / 36th Cross
28th Main / 39th Cross
28th Main / 45th Cross
East End Main / 36th Cross
East End Main / 39th Cross

- Interventions Required**
- Marking of Bicycle lanes for up to 100 m leading to all these intersections by BBMP.
 - Installation of Signages at the intersections as indicated here by BBMP.
 - Construction of Raised Pedestrian Crossings by BBMP.

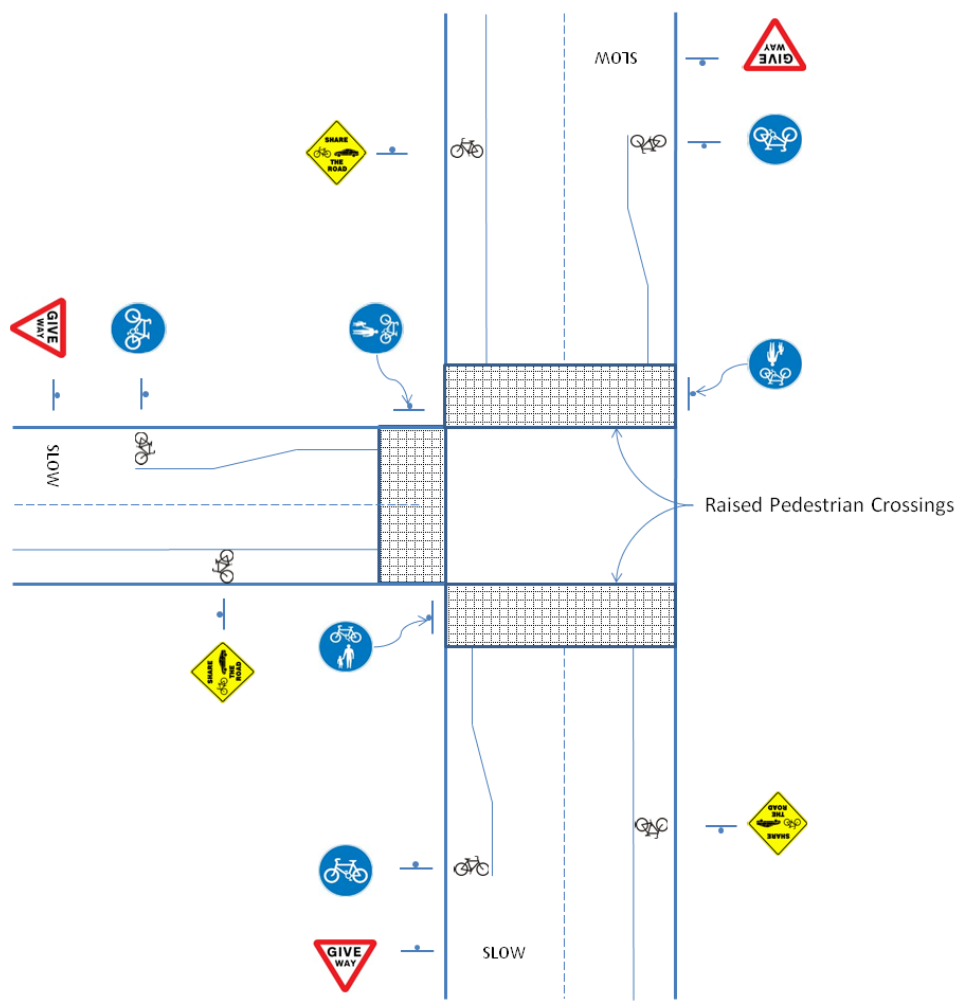
Four-legged Median Open Non-Signalized Junctions



Intersections
1st Main / 40th Cross
2nd Main / 30th Cross
2nd Main / 32nd Cross
2nd Main / 36th Cross
2nd Main / 40th Cross
4th Main / 32nd Cross
4th Main / 36th Cross
4th Main / 40th Cross
5th Main / 27th Cross
5th Main / Diagonal Road
8th Main / Elephant Rock Road
9th Main / 35 A Cross
9th Main / 36th Cross
9th Main / 40th Cross
10th Main / 4th Cross
10th Main / South End Road
10th Main / 33rd Cross
11th Main / 38th Cross
11th Main / 17th Cross
16th Main / 38th Cross
18th Main / 36th Cross
18th Main / 38th Cross
18th Main / 39th Cross
23rd Main / 38th Cross
26th Main / Tilak Nagar Main Road
26th Main / 32nd Cross
26th Main / 36th Cross
26th Main / 39th Cross
28th Main / 36th Cross
28th Main / 39th Cross
28th Main / 45th Cross
East End Main / 36th Cross
East End Main / 39th Cross

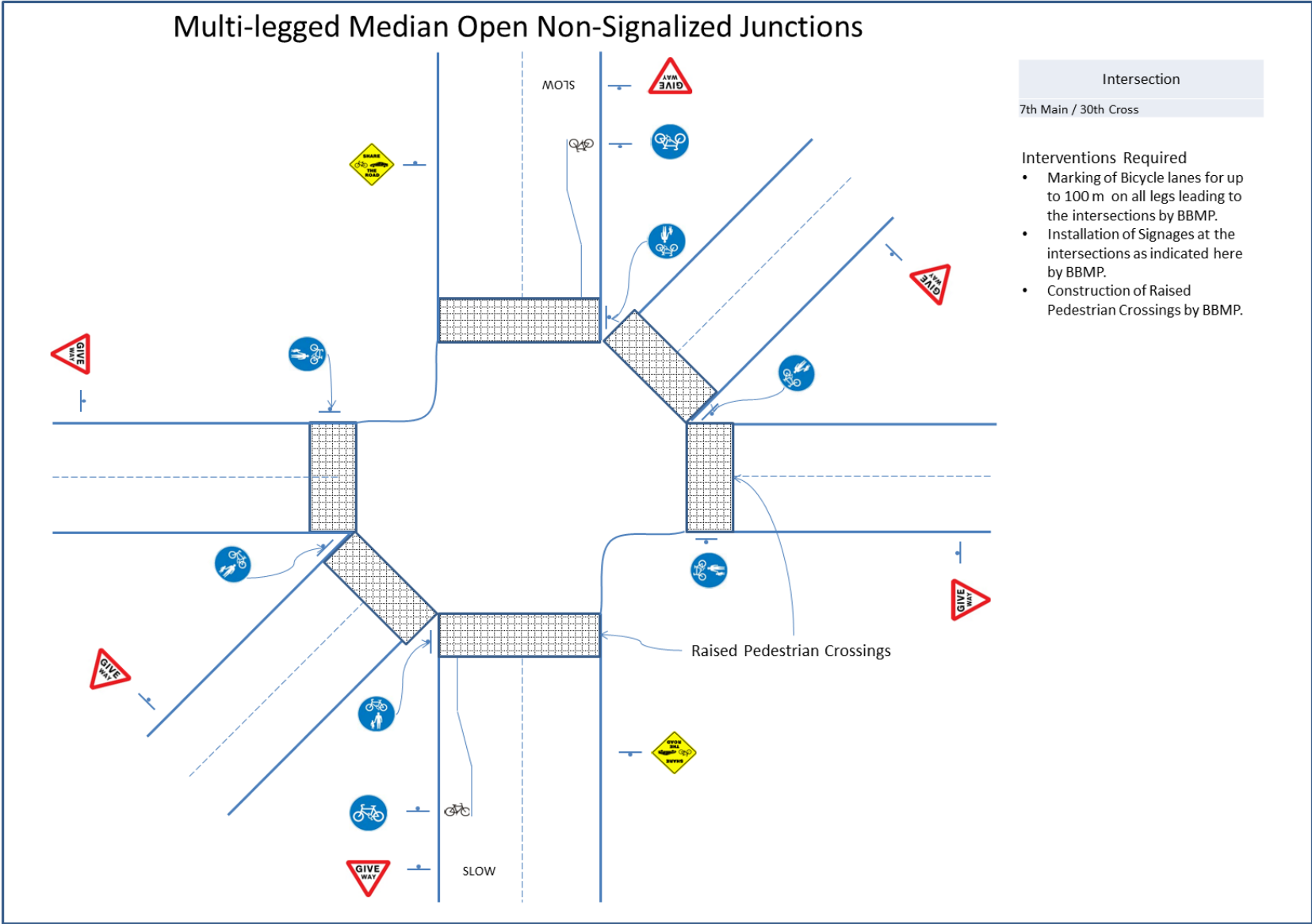
- Interventions Required
- Marking of Bicycle lanes for up to 100 m leading to all these intersections by BBMP.
 - Installation of Signages at the intersections as indicated here by BBMP.
 - Construction of Raised Pedestrian Crossings by BBMP.

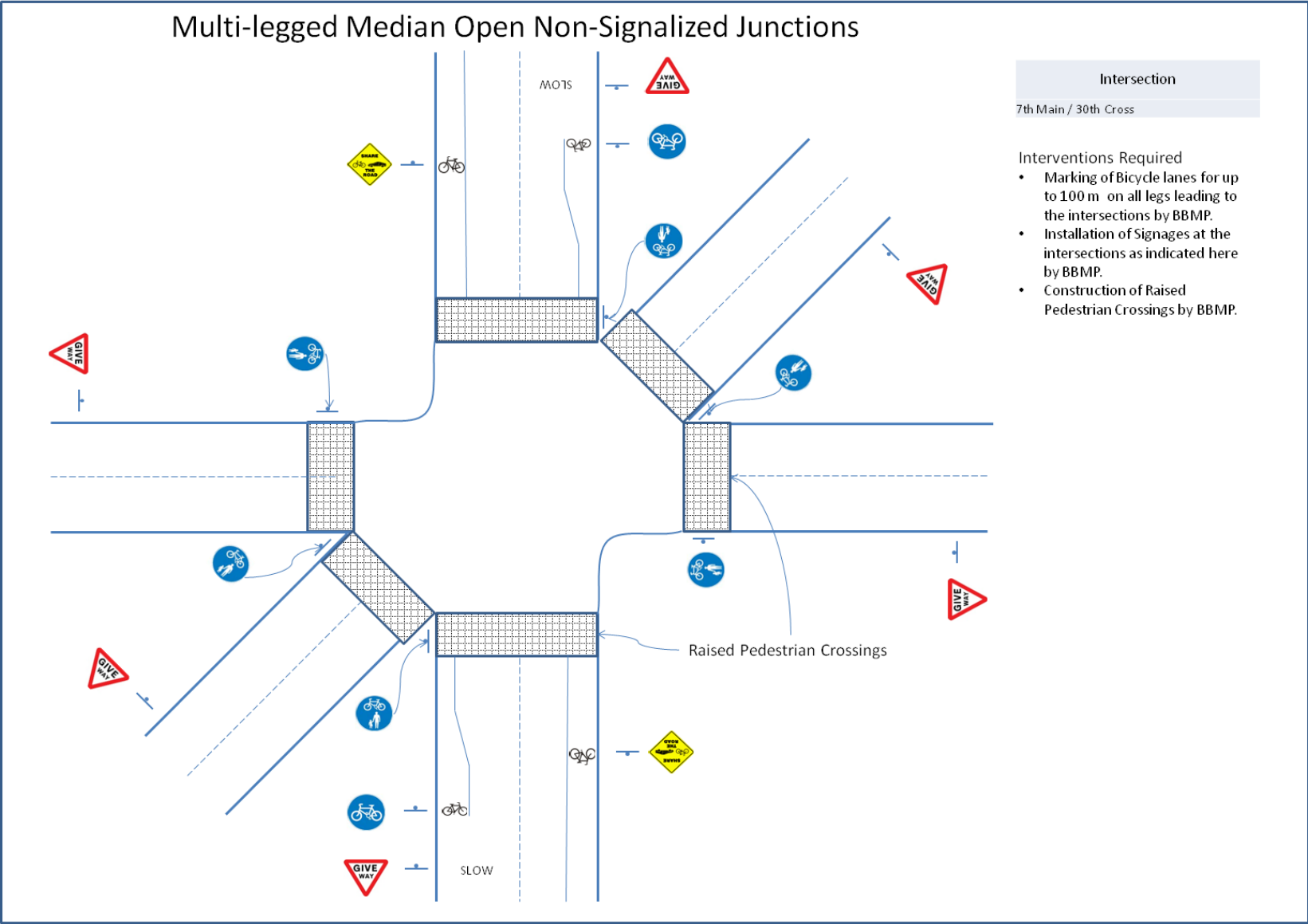
Three-legged Median Open Non-Signalized Junctions



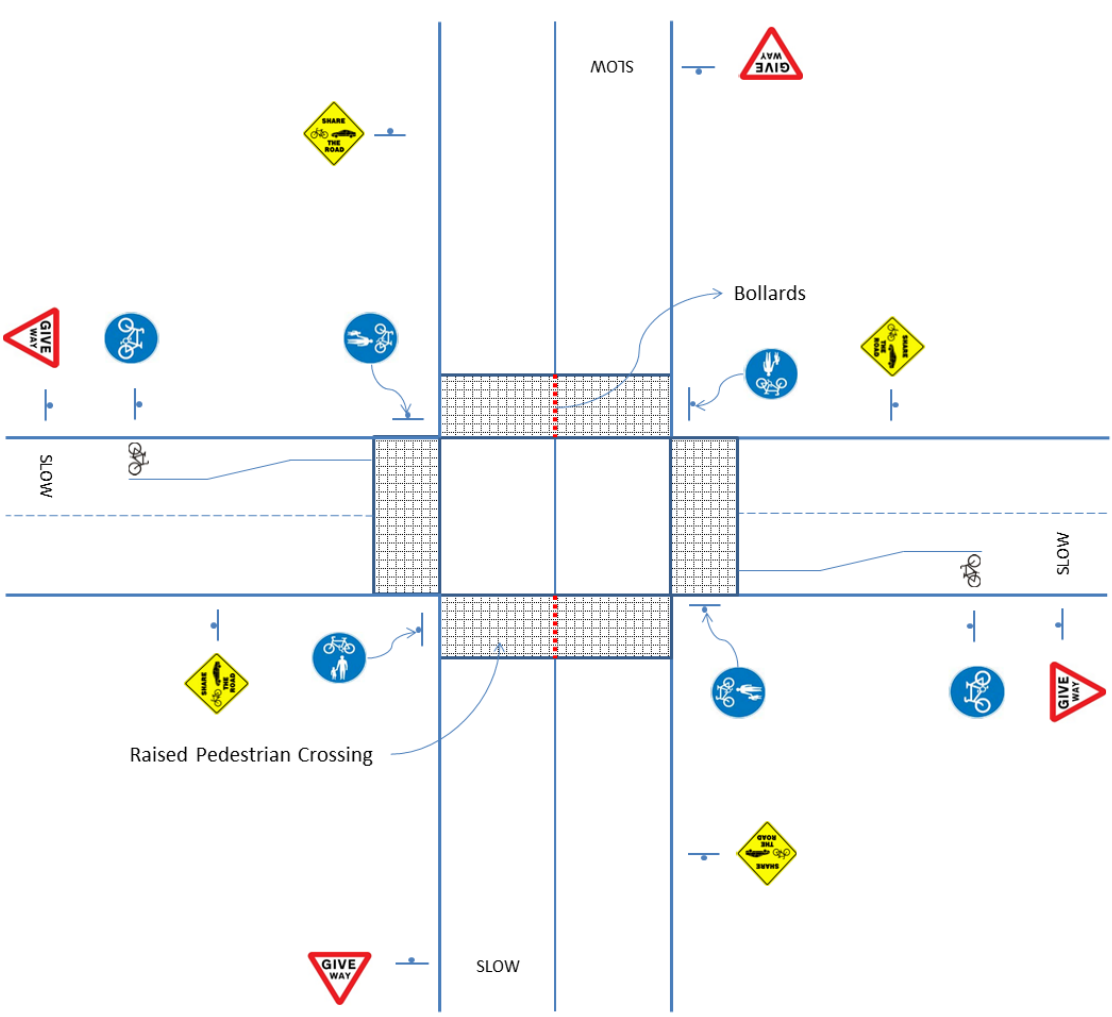
Intersections
2nd Main / 27th Cross
8th Main / South End Road
8th Main / 22nd Cross
10th Main / 40th Cross
10 C Main / Siddapura Main Road
16th Main / 36th Cross
18th Main / 32nd Cross
18th Main / 45th Cross
23rd Main / 36th Cross

- Interventions Required
- Marking of Bicycle lanes for up to 100 m leading to all these intersections by BBMP.
 - Installation of Signages at the intersections as indicated here by BBMP.
 - Construction of Raised Pedestrian Crossings by BBMP.





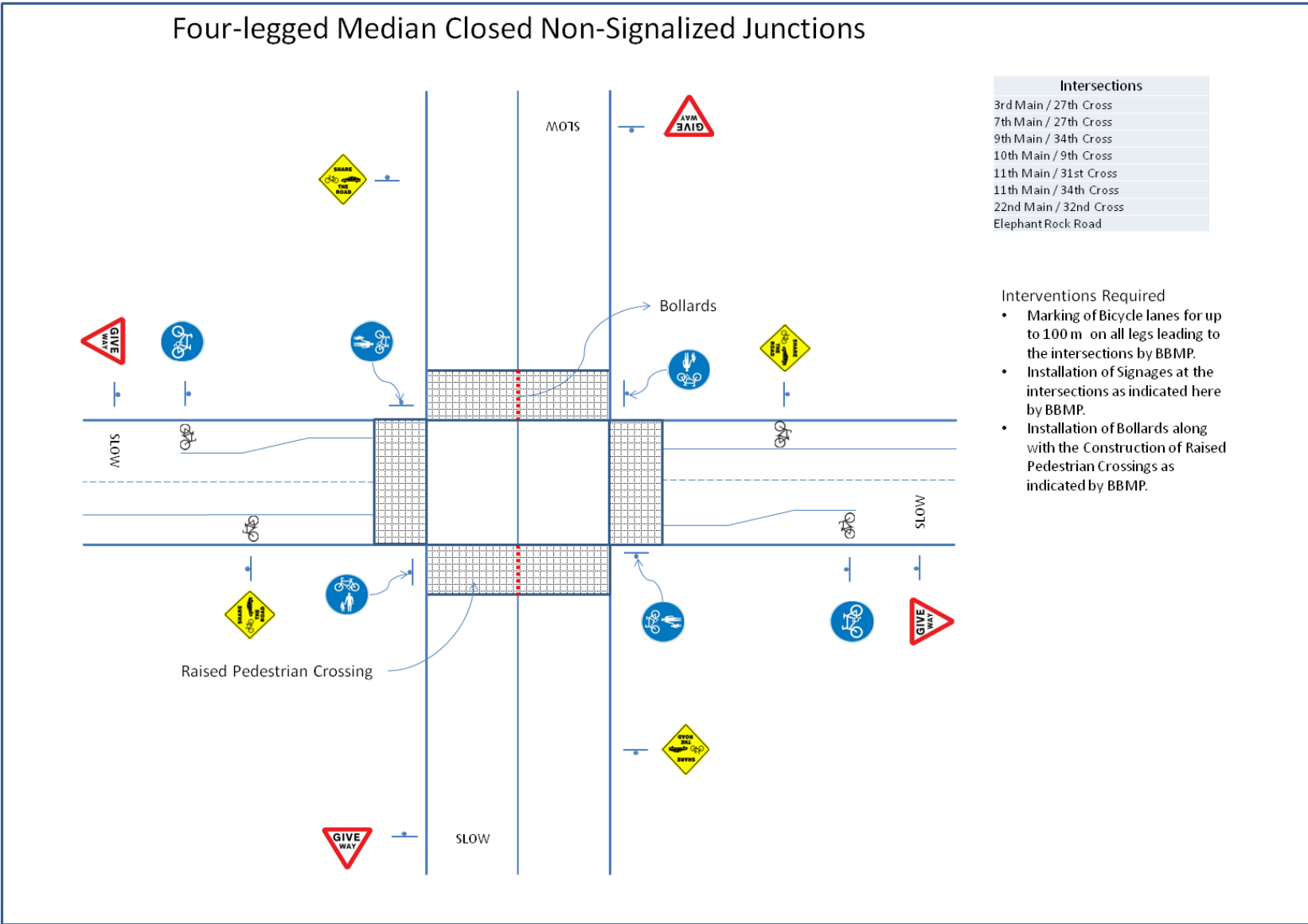
Four-legged Median Closed Non-Signalized Junctions



Intersections
3rd Main / 27th Cross
7th Main / 27th Cross
9th Main / 34th Cross
10th Main / 9th Cross
11th Main / 31st Cross
11th Main / 34th Cross
22nd Main / 32nd Cross
Elephant Rock Road

- Interventions Required**
- Marking of Bicycle lanes for up to 100 m on all legs leading to the intersections by BBMP.
 - Installation of Signages at the intersections as indicated here by BBMP.
 - Installation of Bollards along with the Construction of Raised Pedestrian Crossings as indicated by BBMP.

Four-legged Median Closed Non-Signalized Junctions



Intersections
3rd Main / 27th Cross
7th Main / 27th Cross
9th Main / 34th Cross
10th Main / 9th Cross
11th Main / 31st Cross
11th Main / 34th Cross
22nd Main / 32nd Cross
Elephant Rock Road

- Interventions Required
- Marking of Bicycle lanes for up to 100 m on all legs leading to the intersections by BBMP.
 - Installation of Signages at the intersections as indicated here by BBMP.
 - Installation of Bollards along with the Construction of Raised Pedestrian Crossings as indicated by BBMP.

Annexure C: Clearance of Carriageway

At certain locations indicated below, it is imperative that BBMP undertake measures to clear the carriageway from garbage and unauthorized parking for smoother flow of bicycle movement. These are:

1. 3rd Main – 19th Cross, 6th Block Jayanagar (Garbage removal)
2. 39th Cross – Near East End Main Road (Garbage removal)
3. 10th Main, 7th Block Jayanagar (Tourist Buses, etc.)

Annexure D: Enforcement of No-Parking Zones

For ensuring smoother flow of bicycle traffic, it is observed that on-street parking at these locations can be obstructive. Hence it is recommended that there shall be strict enforcement of no-parking zones at least up to about 100 m along the streets leading to these intersections.

Intersections Name	Remarks
1st Main / 40th Cross	On-street parking on 1 st Main and 40 th Cross
7th Main / 30th Cross	On-street parking along 7 th Main, 30 th Cross and Diagonal Road
11th Main / 30th Cross	On-street parking on 11 th Main and 30 th Cross
11th Main / 38th Cross	On-street parking on 38 th Cross between 10 th Main and 11 th Main
18th Main / 45th Cross	On-street parking on 18th Main
East End Main Road / 45th Cross	On-street parking on East End Main Road

Additionally it is suggested that in dire needs of on-street parking in the locality wherever the Bicycle Friendly Streets are identified, alternate day parking shall be permitted at certain stretches.

Annexure E: Locations of Signage with Network Map in the region.

No	Location Name	Main	Cross	Description
1	JSS Circle	1st Main	36th Cross	Intersection of Kanakapura Road, 1st Main and 36th Cross
2	45th Cross	1st Main	45th Cross	Intersection of 1st Main and 45th Cross
3	27th Cross	2nd Main	27th Cross	Intersection of 2nd Main and 27th Cross
4	30th Cross	2nd Main	30th Cross	Intersection of 2nd Main and 30th Cross
5	36th Cross	2nd Main	36th Cross	Intersection of 2nd Main and 36th Cross
6	40th Cross	2nd Main	40th Cross	Intersection of 2nd Main and 40th Cross
7	Sangam Circle	2nd Main	45th Cross	Intersection of 2nd Main and 45th Cross
8	South End Circle	4th Main	South End Road	Intersection of 4th Main/RV Road and South End Road
9	4th Main	4th Main	30th Cross	Intersection of 4th Main and 30th Cross
10	4th Main	4th Main	36th Cross	Intersection of 4th Main and 36th Cross
11	4th Main	4th Main	38th Cross	Intersection of 4th Main and 38th Cross
12	City Central Library	5th Main	Elephant Rock Road	In front of the City Central Library
13	5th Main	5th Main	27th Cross	Intersection of 5th Main and 27th Cross
14	5th Main	5th Main	33rd Cross	Intersection of 5th Main and 33rd Cross
15	43rd Cross	5th Main	43rd Cross	Intersection of 5th Main and 43rd Cross
16	7th Main	7th Main	Ashoka Pillar Road	Intersection of 7th Main and Ashoka Pillar Road
17	7th Main	7th Main	9th Cross	Intersection of 7th Main and 4th Cross
18	7th Main	7th Main	27th Cross	Intersection of 7th Main and 27th Cross
19	7th Main	7th Main	30th Cross	Intersection of 7th Main and 30th Cross - Opp. Jayanagar Police Station
20	8th Main	8th Main	Ashoka Pillar Road	Intersection of 8th Main and Ashoka Pillar Road
21	8th Main	8th Main	11th Cross	Intersection of 8th Main and 11th Cross Road
22	South End Road	8th Main	South End Road	Intersection of 8th Main and South End Road
23	Elephant Rock Road	8th Main	Elephant Rock Road	Intersection of Elephant Rock Road and 8th Main
24	Tilak Nagar Main Road	8th Main	Tilak Nagar Main Road	Intersection of Tilak Nagar Main Road and 8th Main
25	South End Road	9th Main	South End Road	Intersection of 9th Main and South End Road - Next to Ramakrishna

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No	Location Name	Main	Cross	Description
				Nursing Home
26	Diagonal Road	9th Main	27th Cross	Opposite Jayanagar 3rd Block Post Office
27	Jayanagar Shopping Complex	9th Main	30th Cross	Opposite Jayanagar 4th Block Bus Stop
28	33rd Cross	9th Main	33rd Cross	Intersection of 33rd Cross and 9th Main - Next to JCCA
29	Ashoka Pillar Circle	10th Main	Ashoka Pillar Road	Intersection of 10th Main and Ashoka Pillar Road
30	10th C Main	10th C Main	2nd Cross	Intersection of 10th C Main and 2nd Cross
31	10th Main	10th Main	4th Cross	Intersection of 10th Main and 4th Cross Road
32	10th Main	10th Main	9th Cross	Intersection of 10th Main and 9th Cross Road - Opp Rani Sarala Devi School
33	10th B Main	10th B Main	9th Cross	Intersection of 10th B Main and 9th Cross
34	Madhavan Park	10th Main	South End Road	Next to Madhavan Park and Intersection
35	10th Main	10th Main	38th Cross	Infront of the Playground near the Intersection of 10th Main and 38th Cross
36	10th Main	10th Main	40th Cross	Infront of the Park near the Intersection of 10th Main and 40th Cross
37	11th Main	11th Main	34th A Cross	Intersection of 11th Main and 34th A Cross
38	11th Main	11th Main	39th Cross	Intersection of 11th Main and 39th Cross
39	11th Main	11th Main	45th Cross	Intersection of 11th Main and 45th Cross
40	12th Main	12th Main	24th Cross	Intersection of 12th Main and 24th Cross
41	13th Main	13th Main	39th Cross	Intersection of 13th Main and 39th Cross
42	14th Main	14th Main	24th Cross	Intersection at 14th Main and 24th Cross - Jayanagar 3rd Block East
43	16th Main	16th Main	34th A Cross	Intersection of 16th Main and 34th A Cross
44	18th Main	18th Main	-	Opposite BBMP Park and MLA Office
45	18th Main	18th Main	36th Cross	Intersection of 18th Main and 36th Cross
46	18th Main	18th Main	38th Cross	Intersection of 18th Main and 38th Cross
47	18th Main	18th Main	45th Cross	Intersection of 18th Main and 45th Cross
48	22nd Main	22nd Main	32nd Cross	Intersection of 22nd Main and 32nd Cross
49	Bangalore Central	25th Main	45th Cross	In front of Bangalore Central on 45th Cross

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No	Location Name	Main	Cross	Description
50	26th Main	26th Main	36th Cross	Intersection of 26th Main and 32nd Cross
51	26th Main	26th Main	39th Cross	Intersection of 26th Main and 39th Cross
52	28th Main	28th Main	45th Cross	Intersection of 28th Main and 45th Cross
53	East End Main Road	East End Main Road	32nd Cross	Intersection of East End Main Road and 32nd Cross
54	East End Main Road	East End Main Road	Tilak Nagar Main Road	Intersection of East End Main Road and Tilak Nagar Main Road
55	East End Main Road	East End Main Road	36th Cross	Intersection of East End Main Road and 36th Cross
56	East End Main Road	East End Main Road	39th Cross	Intersection of East End Main Road and 39th Cross
57	East End Main Road	East End Main Road	45th Cross	Intersection of East End Main Road and 45th Cross
58	South End Road	-	South End Road	Next to Surana College
59	Lalbagh South Gate	-	Siddapura Road	Entrance / Exit of Lalbagh South Gate on Siddapura Road
60	Jayanagar Sports Grounds	-	Bairasandra Main Road	In front of the Basket Ball Court at Jayanagar Sports Grounds

Annexure F: Location of Parking Facility (Stands)

No	Location	Description
1	1st Main	In front of Jayarama Seva Mandali - near 40th Cross
2	4th Main	In front of the Park after 38th Cross
3	5th Main	Next to City Central Library - Jayanagar
4	7th Main	In front of Park between 34th and 35th A Cross
5	9th Main	Jayanagar Shopping Complex - near Janatha Bazaar
6	10th Main	Next to Maiya Nursing Home and Opposite Coffee Day
7	10th Main	Madhavan Park Circle
8	10th Main	In front of the Playground between 38th and 40th Cross
9	10th Main	In front of the Park between 42nd Cross and 40th Cross
10	10th C Main	Siddapura Road Intersection near Lalbagh South Gate
11	11th Main	Jayanagar 3rd Block Sports Complex - Main Entrance
12	13th Main	Jayanagar Swimming Pool
13	18th Main	Next to Park on 34th A Cross - BBMP Office
14	30th Cross	Jayanagar Shopping Complex - next to Puttanna Chitra Mandira
15	30th Cross	Jayanagar TTMC
16	30th Cross	Next to Garuda Swagath Mall
17	32nd Cross	Next to Sanjay Gandhi Hospital
18	35th A Cross	In front of the Playground and Opp. Jayanagar Telephone Exchange
19	36th Cross	In front of the Park between 4th and 5th Main
20	39th Cross	In front of the Playground between 17th and 18th Main
21	40th Cross	Adjacent to the Bus Stop between 4th and 5th Main
22	40th Cross	Next to Jayanagar 9th Block Bus Stop
23	45th Cross	Next to Big Bazaar
24	45th Cross	Next to Bangalore Central
25	Bairasandra Main Road	Jayanagar 3rd Block Sports Complex - near Basket Ball Court
26	South End Road	Next to Police Station