



The Process and Practice of Complete Street Development in Delhi

2019

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Author:

Dr. Sandeep Gandhi
Ph.D.

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1 Background

Though efforts in addressing critical issues with road-based mobility in Delhi goes back at least four decades, i.e., 1979-82 during the Asian Games, our attention on finer concerns about safety and efficiency of these road systems concerning all users, are little over two decades old. The first known effort to fix Delhi streets in its entirety was in 1997-98, under a study titled Bicycle Master Plan for Delhi, undertaken by IIT Delhi. As a part of this study, along with a detailed bicycle master plan for the city, detailed street designs were developed for selected corridors in central and East Delhi. These designs included efforts on fixing road geometry, provision of usable and safe pedestrian infrastructure, provision of cycle tracks and even curb side reserved bus lanes. Additionally, it also included designs for improving intersections. These plans were discussed at various levels in the government including with the then LG of Delhi, however nothing was implemented on ground. Following this many efforts were made to undertake formal street re-development exercises in Delhi to develop, what we call today, complete streets. These were initiated in 2002 (BRT Corridor), 2004-10 (Shahjahanabad Redevelopment), 2008-09 (Commonwealth Games), 2009 (Shastri Park to Karawal Nagar BRT corridor), 2010 (East-West BRT corridor), 2015 (PWD Street improvement) and a few more. In total about **860 km** of streets were either identified to be taken up or planned as complete streets till 2015. Annexure 1, Table 1 presents the timeline of these efforts.

2 Scale of the problem

A total of approximately 860 km of streets in Delhi have been identified for streetscaping development over a period of 18 to 20 years. Of these, a little more than 50% have covered the intention to planning gap, and some level of planning (DPR, PPR or DFS) has been achieved. Of the corridors planned, contractors have been appointed and construction initiated on less than 40%, i.e., 180 km. Of these constructions has been completed on about 40% cumulative road length (80 km). This includes Chandni Chowk, which is expected to open for operations by the end of 2020. However, of the corridors completed and operationalized so far, about 50% have either not been completely developed as per original plans or are not being used as planned because of maintenance issues. For example, the bicycle infrastructure on most of the commonwealth games corridors was either not developed or was developed but never used as intended (is currently mostly encroached by vendors or parked vehicles).

Thus, if BRT and Commonwealth games corridors are ignored, more than 15 years of planning effort on close to 400 km of streets have yielded no outcome. Not only have there been no outcomes of these efforts, significant (SGArchitects, 2014) investments made in planning efforts have been lost, and neither these plans nor the learnings in developing these plans appear to be used in current or intended street development efforts. Clearly there are systemic and institutional level issues including capacity constraints, which have led to projects not covering the gap from 'planning to implementation' as well 'implementation to use', and have also led to excessive delays in the projects eventually executed, so much so that the average planning and execution pace is 5 km per year per package (for commonwealth games and BRT it is 5 to 15 km per km per year per package while for others <1 km per year per package).

In this context, it may be interesting to note that the last tender for 100 km had a 90-day proposed timeline (or a pace of 120 km per year per package), for finishing the planning component of the project. This timeline expired five years ago, and the planning process is still ongoing, along with limited sample development process. The latest tender continues to follow this trend, ignoring lessons and understanding from the past. Additionally, the latest package also builds in yet additional scope for detailed traffic modelling and simulation.

3 Reasons

A closer evaluation of reasons behind these historic inefficiencies in complete street planning and execution in Delhi suggests that these inefficiencies can be at three levels – planning, execution/construction and operations as well maintenance (post construction use). These have been explained below under separate heads.

3.1 Planning

Planning inefficiencies mainly stem from weak processes and poor capacity with both the consultants and executing agencies. Following are the key deficiencies which have historically led to planning inefficiencies.

1. **The objective is either not clear or not adequately defined** – *Why do we want to undertake the street-redesigns in Delhi, what is missing in the streets today?* All streetscaping projects have to be driven by a vision of a better and a more livable, sustainable and equitable city for all. It is broadly based on the national urban transport policy (NUTP). A common vision is more often than not, not defined and agreed between the consultant and the client. This often misdirects the planning process early on.
2. **The priorities are not established** – *Are there any user groups that should be prioritized over others given the limited road space and other resources?* Global norms including SDG require that for a more live able city, sustainable modes and vulnerable user groups need to be prioritized over others. Thus, streets need to focus of pedestrians (within this women and children over others) followed by cyclists and public transport (especially bus based public transport because it effects the majority of trips) in that order of priority. Private motorized modes should, as far as possible, be considered to be disincentivized. This order of priority is neither defined nor agreed upon between planners, promoters and executers of the project, leading to disagreements between stakeholders and overall inefficiency in the planning process.
3. **User specific planning requirements (especially for the priority groups) are not understood, agreed and established** – *Who are the key stakeholders in this process? How do we identify and engage with them? Do we understand what their specific requirements and expectations are (for example Indian urban pedestrian, commuting and recreational cyclists and vendors have very different requirements and expectations from the same street) and how to balance and address this through planning, design, operations and regulations?* The weakest link in the street planning chain is the vendor i.e. they can encroach on any space – carriageway, footpath, etc. This is followed by pedestrian then cyclist, then motorized two wheelers, and so on. This means that the order of planning attention needs to follow the same order of prioritizing design attention (and detail) if design success is to be achieved. These requirements are very India specific and thus cannot be addressed by following international guidelines. For example, a bicycle

infrastructure in India is not just for bicyclists, it is for goods rickshaw (which are 1.2m wide), it is for cyclists carrying goods (such as gas cylinders), and it may even have to accommodate other modes like push carts. Additionally, current (and likely in foreseeable future) cyclists in India are mainly captive users and are commuting cyclists (not recreational). These cyclists have very different requirements than say from choice cyclists. Choice cyclists which may be a small minority to begin with prioritize extreme levels of safety, comfort and attractiveness over directness (speed) and coherence (continuity), while commuting cyclists prioritize directness and coherence over safety, attractiveness and comfort. Such specific requirements and characteristics of commuters and modes in our context are not covered in any established international guidelines. They though are covered in some Indian guidelines such as the NMT guidelines by IIT Delhi, the MoUD guidelines, etc. However, integration of plans to meet these requirements in the overall street design is still not clearly understood or established and requires knowledge building through significant on ground experimentation, learning from trying different things and gathering feedback from stakeholders, auditing as well evaluating existing designs, etc. An example of a detailed audit of bicycle infrastructure developed between Moolchand and Delhi Gate by DIMTS along with all stakeholders including traffic police has been presented in (SGArchitects, 2014)

4. **The planning processes are not adequately defined and there is often no planned stakeholder participation** – *What level of data collection is required? How is it useful to meet the objective of the exercise? How will the data be used to inform the planning and evaluation process? Does the planning process allow experimentation and learning thereof?* A closer look at the past and present tender documents for appointing consultants for streetscaping in Delhi suggests, that there may be a mismatch between the process demanded from the consultant and the end result expected (this is why it is important to define a vision). For example, multiple street design tenders have focused on significant and detailed traffic data collection, including traffic projections and traffic modelling. This without defining or requiring any boundary conditions (such as focus on optimization for commuter trips rather than vehicular trips). Not only does this shift the focus of the exercise from street infrastructure planning to traffic planning focusing on cars. It is unclear how this understanding is expected to help even the private motorized modes (cars and two wheelers) especially when it is known that such detailed traffic studies mainly focus on carriageway volume and capacity ratio¹. This is when it is well known that capacity constraint on the carriageway in Indian cities is more an outcome of friction between fast and slow modes which are forced to share the same space because of poor edge design rather than excess volume of traffic above the carriageway capacity. While such elaborate traffic modelling exercises are often demanded from consultants, the bid documents usually do not specify any processes/requirements for planning for other, especially non-motorized modes (how to capture the specific characteristics and requirements, level of attention to detail required, temporal changes in requirements to be addressed, etc.). This is when it is known that these users are the weakest link in the chain and without these users using the facilities as planned, the objectives of the street-redevelopment exercise cannot be met. Evidently the knowledge of the correct approach and processes that can address the varied requirements of different priority user groups in the Indian condition is either very limited or does not exist. Whatever limited knowledge and experience that does exist with individuals and organizations is not made accessible to consultants. Further there is limited room for, and the current processes do not encourage, any experimentation or learning from past projects (through planned audits) to understand the requirements or to test the proposals. This does not help the planning process, and both the executing agencies and consultants are invariably driven away

¹ Plus, it is known that such software are largely incapable of modelling Indian heterogeneous traffic mix

from the objective of the exercise. They also fail to learn from previous successes and failures and detest from trying new innovative ideas that may actually work on ground.

5. **Capacity limitation of executing agencies and consultants, the clash between commuter-based planning and vehicle-based engineering perspective** – *Is there enough in-house capacity (knowledge, experience and expertise) to understand and evaluate the proposals submitted by the consultants? Are there enough consultants with experience and expertise to undertake the scale of the re-development in the time period envisaged?* The bid documents for street re-development projects is a reflection of the understanding and expertise of the team that developed. A review of the last three bid documents floated by PWD for street re-development suggests that approach to the process may be lost between proposals from planners (on a bid designed by engineers) and evaluation by engineers – because planning and engineering though complementing, are two completely different approaches. Planners and designers are desired for the street re-design to carefully and precisely understand and address all user requirements (especially the key stakeholders such as pedestrians, cyclists, bus commuters, residence/businesses owners along the corridor, etc.), address social requirements, cultural requirements and ensure the streets are attractive, comfortable and pleasant spaces for the majority non-motorized modes (but also for motorized users who are to be encouraged to walk and be a part of the pleasant city space proposed). Road engineers on the other hand are trained to follow norms and standards completely oriented towards construction and implementation practices for vehicular (and thus carriageway) requirements only. They thus may have limited training to question the same from a commuter (who can be a cyclist, a pedestrian, a bus users apart from a car user) perspective rather than just a vehicle perspective. Diagonally different training, experience, and job description of these two user groups has traditionally resulted in significant communication issues, where the engineers are unable to appreciate planning considerations (especially over set engineering and implementation considerations) and are often unable to read/appreciate design documents as well street plans (thus the constant push to submit walk throughs and 3D visuals). Proposals designed focusing on non-motorized and vulnerable road users are often evaluated from the perspective of car requirements (clear example is to avoid at grade signalized pedestrian crossings because it leads to delay for car users). The clash of two approaches means inefficient processes and outcomes, where the engineer (who is the client) often overrules the designer (who is the consultant) leading to sub-optimal and unplanned for outcomes. As an example, it may be interesting to note, that for most of the last two decades there has been a disagreement between planners and implementing engineers in the executing agencies on the relative height of the footpath and cycle track from the road level. While it is widely accepted and is mentioned in all international and Indian standards (including revised drainage and construction standards) that pedestrian paths should not be higher than 150 mm and cycle tracks no higher than 100 mm from the road level in order to ensure use, engineers often push for both to be 230 mm above the road level to prevent vehicles from encroaching on footpath and for drainage considerations as per current norm of using the bell mouth. Further there are only a handful of consultants with experience to qualify for the planned street design projects in Delhi. Thus, with the scale of the scope for each project, development of limited corridor length (such as that of Chandni Chowk) may be achievable within the stipulated time period, however it may not be possible to scale it effectively to 100 or 500 km network size.
6. **Lack of specialized knowledge, no specialized or expert advisory committee** – *Can successes of complex complete street development initiatives be achieved without detailed understanding of the 21 different user groups that use these streets, and can otherwise not so experienced consultants be expected to generate this knowledge of their own?* A number of experts in the country and in Delhi have worked on the urban street

designs. This has resulted in multiple Indian street design guidelines being developed and has also resulted in some innovative designs for meeting the varying requirements of different street users. Such experts should ideally be a part of the design review committee within PWD, so that their expert advice can be used to ensure that the plans ensure that objectives of the project will be met. However, in the past PWD has not formally constituted or empowered any such expert committee for street scaping projects. This has led to inefficiencies in design which have affected its eventual use.

3.2 Execution

Execution inefficiencies mainly stem from lack of appreciation by implementing agencies, of detailed designs, and often from lack of knowledge on different execution and implementation processes required to ensure success on ground. These are explained below.

1. **The all or nothing approach** – *Do we need every street to be planned and executed to follow textbook examples of complete streets (requiring excessive budgets and time) or can critical street components be addressed before others, in the interest of effective scaling and faster outcomes?* The current street redevelopment process relies on an all or nothing approach where both the execution agencies and the consultants plan for the ultimate dream street which has to be re-done from scratch. Which means all underground and over ground services are rationalized and redone, carriageway is re-aligned, i.e., the median is shifted, the light poles removed, in order to suit the plan, all boxes of complete street elements in their most desirable form and function are ticked. This is mostly regardless to cost and time implications. Though this kind of an approach may work for pilot or sample stretches, it cannot be effectively scaled to a large road network improvement approach. Consider this, this form of street development while consumes significant time, also requires between 10 to 15 crore per km as development budget, while the consultant costs may also be in excess of 12 lakh per km (especially with the data requirements and the scope built in the current tenders). This means a 500 km street development may require a budget of close to 7,500 crores or 100% PWD budget for the next couple of years. Thus, one of the main impediments in achieving the objectives of the exercise is the lack of phased development of streets (gradual upgradation of streets), which may not only allow better use of limited resources and capacity but may also show quicker outcomes.
2. **The complete dependence on external consultants, no inhouse capacity** – *Is it necessary for street designs and development in its entirety to be outsourced to external consultants, or in-house planning capacity be developed and only specialized services such as service design, structures, landscaping etc., be provided by consultants?* By definition and by provisions in the act PWD as a road owning agency is mainly an executing agency with no capacity to plan for even the basic requirements of the street. This worked fine till the time the objective was only to bridge the supply and demand gap when no road infrastructure existed in growing cities. This because road engineers have the basic training to plan and provide a carriageway with drainage and lighting. However, with growing complexity of requirements from the street (as is planned to be addressed with the streetscaping exercise), there is no capacity with the current PWD engineers to plan the streets to meet the specific requirements of pedestrians, cyclists and other stakeholders, and neither is there any capacity to evaluate such plans produced by a third party. In effect this means that there is no repository of knowledge that would be gained, to ensure a sustained and ever improving process. This knowledge remains with the consultants and does not get transmitted to the client (as there is not planning capacity with the client)/PWD. This is mainly because there is no current capacity with the PWD to absorb this knowledge and use it in the

future efforts, or for even operations, maintenance, and further upgrades on the corridor/street without depending on external help.

3. **Lack of appreciation of different but specific construction/execution requirements of complete streets** – *Are the traditional methods of execution and project management good enough to achieve the desired outcomes of complete street development, or additional/new processes need to be adopted?* Current methods used for project execution for development of complete streets, often do not appreciate the need to adopt different or new processes. For example, the complete street designs are based on detailed plans and geometric designs of roads. Unlike traditional practices of carriageway development which relies on longitudinal and cross section designs, these rely on detailed plans with careful placement of different street and landscaping elements. This cannot be achieved without using total station technique for detailed site layout, which is not traditional used. Engineers often avoid adoption of these new techniques (nor re these requirements built in the bid document), thereby leading to site problems and unwanted complications, which in turn lead to delays, cost overruns and sub-optimal outcomes.
4. **Lack of professional project management and monitoring** – *Can Street re-development projects, which involve multiple stakeholders and agencies be delivered with professional project management and/or monitoring by a dedicated senior nodal officer?* By far one of the biggest reasons for delay in execution of street development projects is the lack of co-ordination between different utility providers and different stakeholders on the road. Experience in the past has shown that projects could only be fast tracked if they were monitored on a daily basis by the very top or there was a court enforced deadline making all stakeholders equally answerable to the court (or the topmost of the leadership in the city). This is how Commonwealth Games streets could be completed in a stipulated time frame and for the same reason Chandni Chowk Street development has been not far from its promised deadline. In both cases, the pressure from the very top required an appointment of a nodal officer, with no other responsibility, dedicated, responsible and answerable for the project progress. In the absence of such a management and monitoring strategy many projects have faced excessive delays.
5. **Lack of public outreach** – *Can success of projects which appear to inconvenience the minority, but vocal car users be guaranteed without actively addressing and communicating their concerns?* Though all immediate stakeholders of the project should be involved during the planning process of the street, there is a critical role for planned public outreach for the project, especially during the project execution stage, in order to reach and explain to the wider audience the short- and long-term benefits of these projects. This is because the project features start to become more visible during this stage and the public at large starts to be inconvenienced by the construction process. In the past, in the absence of these efforts, negative media attention to the projects has forced planners to compromise on critical project provisions or has led for implementing agencies to not owning up or altering the plans post or during implementation (mostly without the knowledge of the consultants). This invariably results in project delays and stalled implementation.

3.3 Operation and maintenance

There are known inefficiencies in the operations and maintenance processes of complete streets in Delhi (as well other cities in India) which can mean that streets designed with best of intentions and knowledge are susceptible to not being used as planned. These inefficiencies have been explained below.

1. **Lack of enforceable parking policy** – *Can reserved infrastructure for pedestrians and cyclists be protected from encroachment simply by using design elements without an enforced parking policy?* In the absence of any parking policy in Delhi, parking is difficult to provide and enforce on the streets. This means that planned street redevelopment infrastructure is quickly encroached by private vehicles mainly motorized two wheelers, resulting in failure of such efforts to meet their objectives.
2. **Lack of Capacity and knowledge to maintain specifically designed complete street infrastructure including pedestrian paths and cycle tracks** – *Can a complete street be operated and maintained by city engineers without the knowledge and appreciation of its detailed plans?* To ensure constant and sustained use of developed streets as planned, there is a significant role of maintenance of the developed infrastructure. This requires in-house knowledge of the design approach for the street so as to ensure that in case of repair or damage the street infrastructure can be restored to its original profile and finish in order to ensure continued use. Such a knowledge is also useful to plan repairs and maintenance, to ensure facilities like bicycle and pedestrian infrastructure remain unobstructed during any repair/upgradation work (see Annexure 2). This is currently not achievable in the absence of inhouse planning capacity with the knowledge of complete street requirement within PWD. Because of this, it is observed that majority of street infrastructure remains unusable (especially for cyclists and pedestrians) after any such repair or regular maintenance.

4 The Solutions

It is clear that the current processes applied for re-development small stretches or pilot streets have shortcomings and limitations. Additionally, it is critical to understand that even if adequate, the processes applied to development of small/pilot stretches of corridor as complete streets cannot be directly scaled for application on large networks in the range of 100 to 500 km. Thus, a different approach is required. There can be **two broad approaches** for implementation of the street development projects and for both approaches, adoption of **six critical strategies** is required.

The two broad approaches to take up city wide street network re-development in Delhi can be:

- **Traditional method of street planned and developed by the State as two separate contracts, for planning and implementation** – This is the standard approach requiring planning, design and execution by the State actors, with financing from the State. This process has the highest promise of an equitable and a more democratic development. This approach can be made more effective by the adoption of the five strategies explained below.
- **Design, build and operate contract for street development** – In this case the ownership of the road remains with the State, however it collaborates with private entities for innovative BoT type financing and development options. For example, the state takes out a bid for the planning, development and operations of a street. The private developer who wins the bid promises to pay for the design and development (either in part or in full) in exchange of the promise of collecting user charges form the street. Which in the case of Delhi may be limited to revenue from parking and advertisement. However, in some conditions it can be expanded to cess on property tax, sale of FAR, etc. The advantage in such an approach may be that the design and

build contract may promise faster and smoother implementation without the need to go through two minimum two bidding processes and then subsequently resolving issues between the planner and the developer.

Six main strategies that constitute this different approach emerge from the discussion above. These are:

- **Define objectives, priorities and planning principles** – The project objectives, priorities (which modes to be prioritized above others) and planning principles (defining how to balance between varying requirement of different user groups) should be defined and made a part of the bid document, and the consultant contract. The bidding and the tendering process needs to be designed to be aligned to planning principles and priorities defined in the document. For example, when non-motorized modes are to be prioritized and friction between slow- and fast-moving modes is to be reduced, the planning approach will not require traffic modelling, projections and simulations. This will help retain the focus of the exercise and will also ensure optimization of resources deployed to meet the project objectives more effectively.
- **Plan for gradual street upgradation (phased development)** – All or nothing approach should be avoided in favor of a phased or gradual improvement approach where the final street plan is developed in the first phase, however the implementation process is broken into multiple stages, each stage allowing for experimentation and learning. In addition, the focus of this exercise should be to reduce implementation cost and time with each stage generating a finished street with possibility of upgrade and improvement in successive stages. For example, the first stage may include development of landscaped footpaths, service lanes, junction treatment etc., but may not include a full-scale level difference and segregation of bicycle infrastructure, though space may be reserved for the same using temporary or semi temporary means such as spring posts and plastic bollards. The bid document or the consultant contract should build in audit-based finalization of such provisional measures on the streets, where at each developmental stage a finished product is achieved.
- **Develop in house planning and design capacity within PWD (limited institutional restructuring may be required)** – This is essential so as to allow an effective appreciation, review and response to the plans developed by the consultants. It is also expected that with the increase in the street network required to be taken up for re-development to achieve a city-wide improvement, atleast some stages of the planning and development work of atleast some of the streets will need to be taken up in-house by PWD. One method for achieving this capacity would be to setup a street planning/design department or a cell with contractual manpower within the PWD, headed by a chief planner with the same rank and position as the chief engineer. A separate note had been developed on the requirements for setting up such a department. This note has been included in recommendations for Urban Street planning and Design Cell (SPADe) (SGArchitects, 2018) to this document. It is estimated that total cost of inhouse design and development of the streets will be 1/3rd to 1/4th of the current consulting rates for the same work. Additionally, an inhouse street planning and design capacity with PWD will result in faster implementation and more effective operations and maintenance of the developed infrastructure.

- **Implement parking policy on the re-developed streets** – All streets selected for re-development should be necessarily covered under the parking policy. However, the provisions in the policy can be designed for phased implementation (example limited free parking for residence in the first phase). Additionally, the implementation of parking policy may be incentivized with other benefits such as higher investment in the neighborhood.
- **Appoint a nodal officer with adequate powers and seniority to ensure effective project coordination and execution** – One of the most effective strategies for ensuring faster and smoother implementation of street development projects is to appoint a senior nodal officer with sole responsibility of project co-ordination and monitoring with dedicated officers for specific packages under him (all with no other role and responsibility in the PWD). Such a nodal officer should have the required mandate and powers and should have the requisite support staff. He will be heading the project monitoring office but may not be responsible for day-to-day project management such as quality control and billing which shall be handled as per protocol by other engineers/officers.
- **Setup an expert design committee** – PWD should set up a formal expert design review committee which includes experts with experiences in street development projects from different fields of design, transport, structures etc., to review plans developed by consultants/developers, provide advice, address any concerns, etc. This committee will be useful in ensuring that all plans developed are effective in meeting the objectives of the project and will ensure that planning principles and priorities are followed.

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Annexure 1

Table 1: Timeline of Complete Street Development efforts covering 860km in Delhi

S. no.	Project Name	Project Period	Consultant	Execution Agency	Project/corridor length	Project Status
1.	Bicycle Master Plan for Delhi	1997-98 (planning: 1997-98)	IIT Delhi	-none	15km	Not executed
2.	Ambedkar Nagar to Delhi Gate BRT Corridor	2002-08 (planning 2002-2008, execution 2006:2008)	IIT Delhi, Rites Ltd.	Transport Department Delhi	15 km	5.8km developed 100% and operationalized, 8.7km developed 85%, not operationalized
3.	Shahjahanabad streets (Jama Masjid, Sp Mukerjee Marg, Chandni Chowk, Subhash Marg)	2005- till date (planning 2005-17, execution (2012-till date)	Private consultants	Shahjahanabad redevelopment coporation (SDC)	7 km	3 km (S P Mukherjee Marg) partly developed and operationalized, 1.5km Chandni Chowk to be operationalized by end of 2020
4	Commonwealth games street re-development	2008-11 (Planning 2008-2010, Execution 2009 – 2011)	Private consultants (3 to 4 packages)	PWD, NDMC	~60km	Entire length developed and operationalized
5	Shastri Park to Karawal Nagar BRT Corridor	2009-2012	DIMTS	--	16km	DPR developed, no execution undertaken.
6	East-West BRT Corridor	2010-11	UMTC	PWD	21 km	Detailed Feasibility Reported developed and approved by EPCA
7	Integrated transit corridors/BRT Phase 3	2011-2012	DIMTS & PWD (116km by DIMTS and 105km by PWD)	PWD	221km	PPR Developed, no execution undertaken
8	Integrated transit corridors phase 4	2011-12	DIMTS & PWD	--	398km	Corridors identified, no work initiated
9	Aapki Sadak	2012-13	Private consultant	SDMC	5km	Detailed plans developed
10	PWD Streetscaping	2015-till date	3 private consultants for 3 packages	PWD	100km	DPR developed, development of sample stretches on site initiated in 2020