BEFORE THE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH AT NEW DELHI

ORIGINAL APPLICATION NO. 363 OF 2022

IN THE MATTER OF:-

Vikrant Tongad …Applicant

Versus

State of Uttar Pradesh & Ors. …Respondents

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Through

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Place:- Delhi

Dated:- 19.02.2024

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BRIEF SUBMISSIONS ON BEHALF OF THE APPLICANTS

The Applicants above-named

MOST RESPECTFULLY SHOWETH:

1. That during the course of the hearing on 03.11.2023, this Hon'ble Tribunal was pleased to permit the Applicants to place on record certain relevant scientific materials and other documents and written submissions for proper adjudication of the case.

2. That the contents of these submissions may be read as part of the Original Application and in pursuance to the Status Report and Brief Submissions, dated: 08.10.2022, filed on behalf of the Applicants, in the instant matter.

3. That at the outset it is submitted that any concretization of the roadsides/roadberms in the name of paving or otherwise, is highly deleterious and an irreversible hazard to the ecology and environment, in as much as the same tends to inter alia obstruct rainwater infiltration and consequent groundwater

recharge, causes run-off, urban flooding, severe water logging, eliminates biodiversity, creates Urban Heat Islands, trapping of heat generated in the atmosphere, compaction of soils, loss of soil (a major Carbon sink) and organic matter, therein, and increases the concentration and accumulation of Carbon (in the form of Carbon dioxide, a major Greenhouse gas) in the atmosphere, which in turn, leads to warming of the atmosphere.

4. That it is further submitted that grassing or vegetation or landscaping of the roadsides/roadberms is ecologically and environmentally productive and sustainable and is the critical needs of the hour in light of no or negligible ground water recharge, rising air pollution and heat and increasing extreme precipitation (notably rainfall) amid Climate A Concretised/paved surface only tends to scatter/disperse pollutants as against grasses, which have a strong tendency to increase the water percolation rates and absorb all pollutants/particles, which, otherwise gives rise to PM10 levels and a consequently, high AQI.

5. That the National Clean Air Program (NCAP) expressly emphasizes on the Greening of open spaces and Street sides as an action plan for improving the air quality. The Ministry of Housing and Urban Affairs (MoHUA) has specifically informed through the PRANA (Portal for Regulation of Air pollution in Non-Attainment Cities), that it is in the process of increasing the total permeable spaces from 1885 acres to 2575 acres. The MoHUA has further informed that Rs. 1768 crore has been allocated to Green Spaces and Parks sector.

(A True Copy of the relevant pages of the information disseminated by the Ministry of Housing and Urban Affairs pertaining to Greening of open spaces and Street sides and increasing the total permeable spaces from 1885 acres to 2575 acres, as extracted from the PRANA Portal on National

Clean Air Program (NCAP) is annexed herewith and marked as **ANNEXURE A-1**)

6. That the United States Environment Protection Agency (EPA) defines a Green Street as *"a storm water management approach that incorporates vegetation (perennials, shrubs, trees), soil, and endangered systems (e.g. permeable pavements) to slow, filter, and cleanse stormwater runoff from impervious surfaces (e.g., streets, sidewalks). Green streets are designed to capture rainwater at its source where rain falls"*. The EPA further calls for having green streets for the reason that *"Green streets protect water quality in rivers and streams by removing up to 90% of pollutants. They replenish ground water supplies, absorb carbon, improve air quality and neighbourhood aesthetics, and provide greeb connecrtions between parks and open space. Vegetated curb extensions improve pewdestrian and bicycle safety, and calm traffic*". According to the EPA, *"Green streets reduce peak stormwater flows, free capacity in the pipes to carry more wastewater to the sewage treatment plant, and reduce or stop sewer backups in basements"*. The EPA further stresses:

"Green Streets can be used to:

- *Minimize stormwater impacts on the surrounding area through a natural system approach that incorporates a variety of water quality, energy-efficiency, and other environmental best practices;*
- *Integrate green stormwater management features to increase infiltration and/or filtration of runoff, reduce flows, and enhance watershed health;*
- *Make the best use of the street tree canopy for stormwater interception, as well as temperature mitigation and air quality improvement;*
- *Mitigate or prevent localized flooding;*

...

- *Improve the aesthetics of a community; and,*

- *Increase a community's livability."*

(Emphasis added)

(A True Copy of the relevant extracts of the United States Environmental Protection Agency [EPA], pertaining to Green Streets, is annexed herewith and marked as **ANNEXURE A-2**)

7. That an Article, titled *"A Guide to making street improvement in San Francisco"*, while stressing on the need for Sidewalk Landscaping, reads as follows:

"Sidewalk Landscaping

Landscaped sidewalks look great, provide habitat for birds and butterflies, reduce stormwater runoff, improve neighborhood livability and increase property values. Sidewalk landscaping is a simple and inexpensive street improvement that individual residents and property owners can make on their own.

Sidewalk landscaping may be installed by small property owners, by major new development or as part of corridor-wide improvements.

Sidewalk landscaping may be built as a standalone feature, or in coordination with other streetscape features, such as street trees, bioretention planters (rain gardens), or permeable paving. Street trees are encouraged along with sidewalk landscaping where they are currently lacking.

Sidewalk landscaping should use drought-tolerant species. Deep-rooted native or drought-tolerant species have many benefits including tolerance to flooding and drought, low or

no irrigation needed once established, improving water quality by filtering pollutants, and aerating and increasing the permeability of soils. Native and drought-tolerant species provide wildlife habitat and generally contribute to the health of the soil, and should be considered wherever understory landscaping projects are implemented.

Planting Along the Property Line

On streets where there is not enough sidewalk space to install sidewalk landscaping in the furnishing zone or where sidewalk width allows, planting in the frontage zone should be considered.

Planting in Medians and in Parking Lanes

Medians: Landscaping may be included in medians greater than 4 feet in width, including curbs. Landscaping in medians is strongly encouraged wherever site conditions allow. Low maintenance, drought tolerant species are encouraged."

(Emphasis added)

(A True Copy of the Article, titled *"A Guide to making street improvement in San Francisco"*, which stresses on the need for Sidewalk Landscaping is annexed herewith and marked as **ANNEXURE A-3**)

8. That the Green Highways Policy 2015, framed by the Ministry of Road Transport and Highways, Government of India strongly propagates and assigns responsibility of the road implementation agencies to develop green corridor along highways by planting selective ornamental trees, landscaping and turfing with grasses and ornamental shrubs.

The relevant parts of the Green Highways Policy 2015 are reproduced as under:

"...

2. Institutional arrangements and‹Financial Pattern□f□

2.1 It is experienced that the scenario of road side plantation is not satisfactory in most of the projects implemented through BOT, DBFOT and public funded projects. This is the responsibility of road implementation agencies to develop green corridor along highways for aesthetic enhancement of the project corridors and places of importance by planting selective ornamental trees, landscaping and with grasses and ornamental shrubs, in order to reduce the impact of air pollution and dust as trees and shrubs are known to be natural sink for air pollutants and carbon sequencing. It also reduces noise pollution and provides much needed shade on glaring hot roads during summer. Plantation arrests soil erosion at the embankment slopes, prevents glare from the headlight of incoming vehicles and moderates the effect of wind and incoming radiation. Green corridors guide the drivers for long distance curves and openings.

6.3. Plantation Pattern

6.3.1. The road landscape shall be developed envisaging a holistic approach to the entire stretch. A concept shall be evolved so as to maintain visual characteristics and uniformity in terms of landscape along the stretch. In the absence of uniform land availability for the plantations, different schemes may be worked out in tune with local variations in the design. Depending on the available ROW, plantation pattern shall be worked out as follows:

Planting of shrubs in the median.

Planting of herbaceous species as ground cover in the median, special landscapes, and embankment slopes.

Turfing with grass in the median, special landscapes, and embankment slopes.

…"

(Emphasis supplied)

(A True Copy of relevant parts of the Green Highways Policy 2015, of the Ministry of Road Transport and Highways, Government of India, is annexed herewith and marked as **ANNEXURE A-4**)

9. That the Guidelines for Pedestrian Facilities, 2012 of the Indian Roads Congress (IRC) clearly distinguishes between a roadberm and a Sidewalk. According to the IRC Guidelines, a Sidewalk is always above the level of the carriageway, separated by kerbs, unlike a roadberm or roadside which is the flat portion along the road, situated between the edge of the road and the drain (stormwater drain) if any or the boundary line of the property.

The relevant parts of the IRC Guidelines for Pedestrian Facilities, 2012 reads as follows:

"

…

Footpath (Footpaths)- It is a portion of right of way of road used for the movement of pedestrian traffic.

Pedestrian Level of Service (LOS)- Pedestrian level of service indicates the environmental qualities of a pedestrian space and serves as a guide for development of standards for pedestrian facilities. Environmental factors that contribute to the walking experience and therefore to the perceived

level of service, such as comfort, convenience, safety, security and attractiveness, should also be considered.

5.2 Concept of Pedestrian Level of Service

Pedestrian level of service indicates the environmental qualities of a pedestrian space and serves as a guide for development of standards for pedestrian facilities. Pedestrian spaces should be designed in consideration of human convenience and have to be qualitatively suitable to the needs of human beings. The planning and design methods for pedestrian suggested by many researchers are based primarily on vehicular traffic flow theory. Additional environmental factors that contribute to the walking experience and therefore to the perceived level of service, such as comfort, convenience, safety, security and attractiveness, should also be considered.

5.3 Physical Characteristics

The pedestrian facilities shall comply with following physical characteristics:

(v) Potential for Vehicle Conflict: The footpaths need to be segregated from the roads, where fast moving vehicles ply. The two ways to protect the pedestrian from vehicle conflicts is the raised footpaths and the guardrails.

6 PEDESTRIAN FACILITIES DESIGN STANDARDS

6.1.2 Footpaths should be regarded as a transportation system which is connected and continuous, just like roadways and railways. They should not be sporadically placed where ever convenient, but instead should be provided consistently between all major attractions, trip generators, and other locations where people walk. In order

to be effective, the sidewalks should be provided on both sides of the road and above the level of the carriageway separated by kerbs. Height of the kerb at the edge should, however, not exceed the height of a standard public step riser i.e. 150 mm.

6.1.3 Clear walking zone

…

A change in surface at the edge, such as a grass or ground or a verge, which often occurs naturally anyway, will help to prevent persons from straying off the path.

The minimum 1.8 m (width) x 2.2 m (Height) Walking Zone should be clear of all obstructions – both horizontally and vertically.

6.1.5.2 Footpaths should normally be designed for a pedestrian Level of service B, thereby providing wide pedestrian facilities for pleasant and comfortable walking. Under resource constraint, Level of Service C can be adopted for deciding width of footpath (Table 1). The width of the footpaths depends upon the expected pedestrian traffic and may be fixed with the help of the following guidelines subject to not being less than 1.8 m.

…

6.2.1 Kerb height

Maximum height of a pavement (including kerb, walking surface, top-of-paving) shall not exceed 150 mm from the road level, which is the standard anthropometric height of a public step/ riser."

(Emphasis supplied)

(A True Copy of the relevant pages and extracts of the Guidelines for Pedestrian Facilities, 2012 of the Indian

Roads Congress is annexed herewith and marked as **ANNEXURE A-5**)

10. That the Noida Authority has been carrying out massive concretization of the soft, green roadsides and roadberms after uprooting the roadside grasses and vegetation at the behest of Arun Vihar Residents Welfare Association, Noida.

    (A True Copy of Letter, dated, 17.08.2021, sent by the Noida Authority to the husband of Applicant No. 2 is a annexed herewith and marked as **ANNEXURE A-6**)

11. That road-side and road-berm concretisation has taken such severe form in the twin cities of Noida and Greater Noida that hundreds of kilometres and wide green, vegetated roadsides have been replaced with concrete in most of the areas. The act of indiscriminate concretization of roadsides and roadberms continues to be an exponentially-increasing, irreversible ecological hazard and in transgression of the principles of Sustainable development and precautionary principle as provided under Section 20 of the National Green Tribunal Act, 2010 as also in utter disregard of the well settled principle of inter-generational equity.

12. That no attempts to minimise surface run-off of precious rainwater and 'Catch-the-Rain' have been made by the Respondents on the roadsides and this year, too, despite groundwater level alarmingly declining, more than 90 percent of precious rainwater falling on the roads has been once again lost to run-off into dirty choked drains. The annual phenomenon of urban flooding even with the lightest showers have plagued Noida and Greater Noida, this year as well.

13. That green and vegetated roadsides are being sacrificed at the altar of illegal parking in Noida and Greater Noida. One of the

major reasons for promoting roadside concretisation is to create unauthorized parallel parking lots. To conceal their failure and escape their liability for not ensuring institutional/residential/commercial parking within respective premises, as is stipulated in the master plans, Noida Authority and Greater Noida Authority GNIDA have chosen the easy way out of concertizing the road-sides and road-berms. Not only is sacrificing the naturally soft, green, vegetated roadsides to these illegal parallel parking lots a grave ecological hazard but it also makes the streets more unsafe, hazardous, and hostile for the pedestrians. This adds onto an unpleasant and unhealthy living environment.

14. That inevitable breakage of the concretized roadsides and roadberms creates more dust. Since entire roadsides are first concretised by unskilled labourers and uninformed contractors not leaving even a strip of soft, green. vegetated area for infrastructural work, within a few weeks to months, an inevitable process of undoing and breakage of concrete ensues leading to greater dust pollution

15. That in their attempt to scrupulously concretise every inch of soft, green, vegetated roadsides and road-berms, the Noida authority and Greater Noida Authority, are mostly supported by the concerned RWAs which have been aiding and abetting concretisation within and around their premises. All attempts at appealing, explaining or convincing Noida authority officials and the RWAs such as Arun Vihar RWA have been ignored, neglected, or superseded. In fact, RWAs like Arun Vihar sent out notices against residents who have been maintaining green roadsides at their own expense for more than three decades without any civil encroachments of roadsides, for not being party to the act of excessive concretisation.

16. That it has been the consistent and settled position, vide various consecutive Orders of this Hon’ble Tribunal that the

open land, including the road berms cannot be concretised and are required to be, necessarily kept green and vegetated. However, the Noida Authority and Greater Noida Authority continue to remain audaciously defiant of the Orders and directions of this Hon'ble Tribunal.

17. That the prayers as sought in the Original Application and the Status Report and Brief Submissions, dated: 08.10.2022, on behalf of the Applicants are part of some best practices that can be adopted in all states and UTs.

18. That an urgent and kind intervention of this Hon'ble Tribunal is sought in light of the facts and circumstances as stated hereinabove.

PRAYER

In light of the facts and circumstances as stated hereinabove, it is, most humbly, prayed this Hon'ble Tribunal may be pleased to issue the Directions as sought in the Original Application as also in the Status Report and Brief Submissions, dated: 08.10.2022, filed on behalf of the Applicants and issue such directions for all States and UTs in the country and/or, Pass such other or further Order(s) or direction(s) as this Hon'ble Tribunal may deem fit and proper in the facts and circumstances of the present case.

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Dated:- 19.02.2024

Name of the Ministry

Ministry of Housing and Urban Affairs (MoHUA)

Initiatives/Action Plan: Ministry of Housing and Urban Affairs

1. Swachh Bharat Mission (SBM) activities undertaken under in respect of NCAP and other cities

a) Development and effective implementation of SOPs for dust mitigation in C&D operations

- C&D waste management, including setting up processing facilities are already being funded under SBM-U.
- Mandatory provisions for CPWD and National Buildings Construction Company (NBCC) to use recycled portions of C&D waste in their construction activities, if the same is available within 100 km from the construction site.
- Currently, there are 73 C&D processing plants in the country, with total processing capacity of 7,378 TPD (including those in Delhi), and another 5 plants are under construction with designed capacity of 2,050 TPD. Among NCAP cities, there are 66 C&D waste processing plants with a capacity of 3,950 TPD.
- C&D waste management initiatives are being assessed under MoHUA's annual cleanliness survey - the Swachh Survekshan, and Star Rating for GFC.
- ULBs have beat directed to earmark dedicated collection points for C&D waste, including on-call collection. Bulk Waste Generators of C&D have been advised to manage their own C&D waste within their premises or through the agency authorized by ULB against payment of processing fee.
- Under proposed SBM-U 2.0, 154 cities (comprising all NCAP cities and remaining cities with population of above 5 lakhs) will be eligible for funding for setting up C&D processing facilities.

b) Introducing mechanical sweepers, dust suppressants, water sprinkling system etc.:

- Under SBM-U, mechanical sweepers are an admissible component of funding. About 505 mechanical sweepers are available across India. Among NCAP cities, there are 133 mechanical sweepers but most of them are with 15 cities.
- The Star Rating Protocol for garbage free cities provides for mechanical sweepers for all Million plus cities (for 5-star and 7-star certifications).
- Under proposed SBM-U 2.0, 154 cities will be eligible for funding for procurement of mechanical sweepers. For this, a sum of Rs. 449 crores has been allocated for procurement of 816 mechanical sweepers across 154 cities.

c) Greening of open spaces and Street sides

- 487 parks developed costing Rs. 393 core with enriched green area of -1,885 acre.
- 189 parks under progress costing Rs 214 crore increasing total permeable spaces to ~2,575 acre.

d) Include air quality management rules in building by laws

● Advisories have been issued to the effect that dust, smoke and debris prevention measures such as screens, barricading etc. shall be installed at the site during construction.

● Plastic/ Tarpaulin sheets must be used for trucks bringing sand and construction material.

● Exhaust pipes of DG sets, if installed, must be minimum 10 meter away from the building. In case, it is less than 10 meters away, the exhaust pipe shall be taken up to 3 meters above the building.

e) Enforcement of Solid Waste Management rules

● SBM-U taking forward the mandate of SWM through a multi-pronged approach, covering all major components, viz, segregation of waste at source, collection and transportation, processing (including processing of wet and dry waste fractions into value added products such as compost, bio-gas, electricity), resource recovery using 3R principles through recycling/ upcycling of dry waste in MRFs, and final disposal in scientific landfills.

● Under SBM-U 2.0, an amount of Rs. 39,837 crores is proposed for various SWM components with the expectation that all ULBs will achieve 100% source segregation, collection, and processing, and with all legacy dumpsites remediated.

● MoHUA has been focusing on a Circular Economy, which includes operationalizing the 3R concept and moving towards “zero waste” approach through maximum resource recovery and reuse. The Swachh Survekshan parameters and Garbage Free protocol place special emphasis and scoring for ULBs practising 3R approaches.

f) Control of plastic burning and open burning of waste

● MoHUA has been issuing several advisories and running IEC campaigns to raise awareness among ULBs and citizens against plastic burning and open burning of waste.

g) Implementation of biogas/ bio-methanation plants for managing organic wastes

● Waste to compost, waste to biogas is being funded under SBM-U.

● Currently, there are 86 waste to bio-gas plants (wet waste processing) with total processing capacity of 1,505 TPD, and another 26 plants are under construction, with designed capacity of 2.962 TPD. Among NCAP cities, there are 6 bio methanation plant in 6 cities with 300 TPD capacity.

h) Awareness programmes in community, college/ universities through NCC/ NSS/ NYK, etc.

● Community outreach programs and messages across all citizen categories and groups also address the issue of air pollution. The same will be addressed in a more focused manner under SBM-U 2.0.

i) Management of legacy Municipal Solid Waste

● A total of 3000 acres of legacy dumpsites have been reclaimed. Under SBM-U 2.0, funding for the legacy waste management is covered under the overall umbrella of funds allocated for SWM. Total area to be reclaimed will be approximately 14,000 acres.

2. Activities undertaken by MoHUA for Urban Transport

● MoHUA supplements the efforts of the States by extending central assistance in implementing metro rail projects in cities subject to availability of budgetary resources and feasibility of proposals. GoI has issued National Urban Transport Policy in 2006 and Metro Rail Policy in 2017.

● Standards for MetroLite (suitable for PHPDT upto 15000) and MetroNeo (suitable for PHPDT upto 8000) systems have been issued by MoHUA in July, 2019 and November, 2020 respectively. These systems would address further the requirement of environment friendly public transport for Tier- 2 cities and peripheral areas of Tier-1 cities with same experience and ease of travel in terms of comfort, convenience, safety, punctuality & environment-friendly as that of conventional metro system at much lesser cost.

● MoHUA as per budget announcement 2021 has initiated the process of launching a new Scheme to augment bus based public transport in 102 cities [5 lakh plus population including hilly/ UT/ North East, State Capital cities].

3. Activities undertaken by MoHUA under AMRUT Mission

a) Greening of open spaces and street sides and Non-motorised Urban transport

● Admissible components under Atal Mission for Rejuvenation and Urban Transformation (AMRUT) covering 500 cities. Rs.1.768 crore have been allocated to Green Spaces & Parks sector, while Rs.1,436 crore to Non-Motorised sector for 500 cities which include 107 cities out of132 cities covered under NCAP.

● 701 projects worth Rs.625.2 crore have been taken up by 106 cities out of 107 AMRUT cities in Green Spaces & Parks sector. Of these, 496 projects worth Rs.400.73 crore are completed.

● 51 Projects worth Rs 436.86 crore have been taken up by 16 cities out of 107 AMRUT cities in Non-motorised Transport (NMT) sector. Of these, 26 projects worth Rs.136.11 crores are completed.

b) **Air quality management rules in building bye laws:** Amendments to the building by laws for indoor air quality management are under consideration.

Click below link to explore more.

http://mohua.gov.in/

Swachh Pawan, Neel Gagan

PRANA

"PRANA" – Portal for Regulation of Air-pollution in Non-Attainment cities, is a portal for supporting the monitoring of the implementation of India's National Clean Air Programme (NCAP).

Contact Us

ncap[dot]cpcb[at]gov[dot]in

ncap[dot]moefcc[at]gov[dot]in

Useful Links

Feedback

Learn About Green Streets

On this page:

What is a Green Street?

A green street is a stormwater management approach that incorporates vegetation (perennials, shrubs, trees), soil, and engineered systems (e.g., permeable pavements) to slow, filter, and cleanse stormwater runoff from impervious surfaces (e.g., streets, sidewalks). Green streets are designed to capture rainwater at its source, where rain falls. Whereas, a traditional street is designed to direct stormwater runoff from impervious surfaces into storm sewer systems (gutters, drains, pipes) that discharge directly into surface waters, rivers, and streams.

EPA's Green Streets: The Road to Clean Water <https://youtu.be/txqxeqnhikw> video highlights green streets as a technique for managing stormwater and providing other economic and community benefits. Shown are examples of green streets in localities that have worked with EPA and other partners to incorporate green streets as part of their stormwater management plans. Green features shown include permeable pavement <https://epa.gov/green-infrastructure/what-green-

infrastructure#permeablepavements>, rain gardens <https://epa.gov/green-infrastructure/what-green-infrastructure#raingardens>, vegetative curb areas <https://epa.gov/green-infrastructure/what-green-infrastructure#bioswales>, and sidewalk trees <https://epa.gov/green-infrastructure/what-green-infrastructure#urbantreecanopy>.

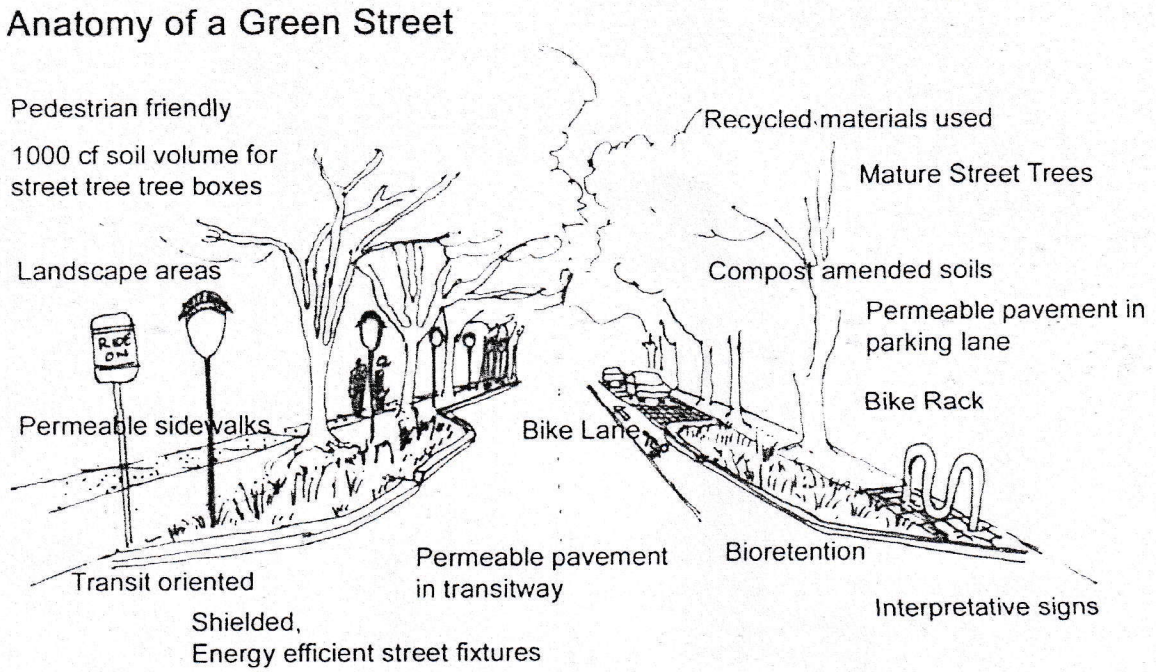
Anatomy of a Green Street

Streets comprise a significant percentage of publicly owned land in most communities, thereby offering a unique opportunity to incorporate green street elements that will not only protect the environment, but can improve community health and prosperity.

Green streets incorporate a wide variety of design elements including street trees, permeable pavements, bioretention, and swales. Successful application of green techniques will encourage soil and vegetation contact and infiltration and retention of stormwater. Although the design and appearance of green streets will vary, the functional goals are the same:

- provide source control of stormwater to limit the transport of pollutants to stormwater conveyance and collection systems,
- restore predevelopment hydrology to the extent possible, and
- create roadways that help protect the environment and local water quality.

The "Anatomy of a Green Street" design graphic below provides details of green street elements. The Low Impact Design Center <https://lowimpactdevelopment.org/> is a great resource hub that provides publications and resources that also support green street Design-Build <https://epa.gov/g3/design-and-build-approaches-green-streets> concepts.



Why a Green Street?

Green streets protect water quality in rivers and streams by removing up to 90% of pollutants. They replenish groundwater supplies, absorb carbon, improve air quality and neighborhood aesthetics, and provide green connections between parks and open space. Vegetated curb extensions improve pedestrian and bicycle safety, and calm traffic.

Green streets reduce peak stormwater flows, free capacity in the pipes to carry more wastewater to the sewage treatment plant, and reduce or stop sewer backups in basements. They can eliminate the need to install or replace expensive underground collection, conveyance and treatment systems. (Source: The City of Portland, Oregon: A Green Street Overview <https://www.portlandoregon.gov/bes/45386>).

A green street minimizes or reduces energy costs for the community. For example, the street lights can use efficient bulbs and ballasts and be powered by an alternative energy source. A green street may minimize material cost and the carbon footprint of its construction by using locally sourced and recycled materials in its design whenever possible. Green streets also make accommodations for greener and healthier transportation such as walking, running, biking, and public transportation. Streets that

incorporate all of these elements are often called Complete Green Streets <https://smartgrowthamerica.org/program/national-complete-streets-coalition/publications/what-are-complete-streets/> .

Green streets can be used to:

- Minimize stormwater impacts on the surrounding area through a natural system approach that incorporates a variety of water quality, energy-efficiency, and other environmental best practices;
- Integrate green stormwater management features to increase infiltration and/or filtration of runoff, reduce flows, and enhance watershed health;
- Reduce the amount of water that is piped and discharged directly to streams and rivers;
- Make the best use of the street tree canopy for stormwater interception, as well as temperature mitigation and air quality improvement;
- Mitigate or prevent localized flooding;
- Encourage pedestrian and/or bicycle access;
- Improve the aesthetics of a community; and,
- Increases a community's livability.

Green Street Resources

The following provide additional information on green street design and use:

- WERF's Green Streets Basics and Design <https://www.werf.org/liveablecommunities/toolbox/gst_design.htm>
- A Conceptual Guide to Effective Green Street Design Solutions: Green Streets (PDF) (7 pp, yy, 6 MB)
- Managing Wet Weather with Green Infrastructure - Municipal Handbook - Green Streets (PDF)(19 pp, 2 MB)
- The City of Portland Oregon: A Green Street Overview <https://www.portlandoregon.gov/bes/45386>

Contact Us <https://epa.gov/g3/forms/contact-us-about-green-streets-green-jobs-green-towns-program> to ask a question, provide feedback, or report a problem.

LAST UPDATED ON NOVEMBER 16, 2021

Discover.

Accessibility <https://epa.gov/accessibility>

Budget & Performance <https://epa.gov/planandbudget>

Contracting <https://epa.gov/contracts>

EPA www Web Snapshot <https://epa.gov/utilities/wwwepagov-snapshots>

Grants <https://epa.gov/grants>

No FEAR Act Data <https://epa.gov/ocr/whistleblower-protections-epa-and-how-they-relate-non-disclosure-agreements-signed-epa>

Plain Writing <https://epa.gov/web-policies-and-procedures/plain-writing>

Privacy <https://epa.gov/privacy>

Privacy and Security Notice <https://epa.gov/privacy/privacy-and-security-notice>

Connect.

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Inspector General <https://epa.gov/office-inspector-general/about-epas-office-inspector-general>

Jobs <https://epa.gov/careers>

Newsroom <https://epa.gov/newsroom>

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Annexure A-3

Sidewalk Landscaping

See also: DPW Sidewalk Landscape Homepage

Landscaped sidewalks look great, provide habitat for birds and butterflies, reduce stormwater runoff, improve neighborhood livability and increase property values.

Sidewalk landscaping is a simple and inexpensive street improvement that individual residents and property owners can make on their own.

Agency who can help:

Department of Public Works
Urban Forestry Permits and Policy
(415) 641-2676

APPLY NOW

PROCESS OVERVIEW

Sidewalk landscaping may be installed by small property owners, by major new development or as part of corridor-wide improvements.

Applicants are encouraged to apply as multiple property owners along a block or neighborhood to enhance the project's benefits and lower costs to the applicants. Talk to your neighbors about putting together a joint sidewalk landscaping application.

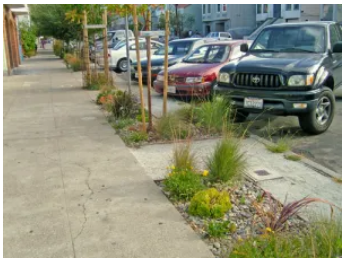
See Building Neighborhood Support

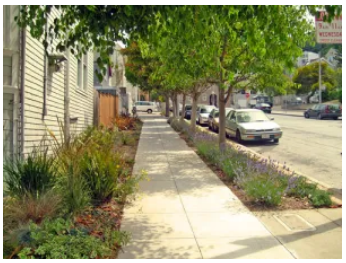
Sidewalk landscaping requires a Sidewalk Landscaping Permit from DPW. A Sidewalk Landscape Permit grants permission to replace a portion of the concrete sidewalk with landscaping. A permit is required to ensure that the landscaping in sidewalk areas is properly constructed and maintained in order to maximize environmental benefits, protect public safety and limit conflicts with infrastructure.

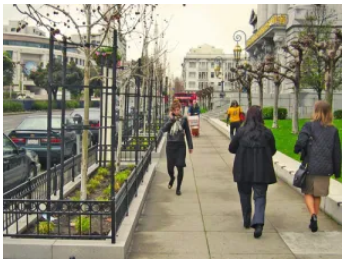
Sidewalk landscaping may be built as a standalone feature, or in coordination with other streetscape features, such as street trees, bioretention planters (rain gardens), or permeable paving. Street trees are encouraged along with sidewalk landscaping where they are currently lacking.

Sidewalk Landscaping Permit – Application

See Permit Process for more information.







OFFICIAL CODES & DOCUMENTS

- **Better Streets Plan** (street design guidelines)
- **DPW Sidewalk Landscape Homepage**
- **Sidewalk Landscape Permit Guidelines**
- **Stormwater Design Guidelines**
  (The SFPUC's guidelines for design of stormwater management features)
- **Stormwater Design Guidelines Appendix A**
  (Stormwater management tools for specific applications)
- **SFPlantfinder** (Sortable database of recommended

FIND PROJECT TYPES

Activating Street Space

Greening & Stormwater Management

Pedestrian Safety & Traffic Calming

Reclaiming Roadway Space

Other Streetscape Elements

Building Neighborhood Support

Work with your neighbors to make street improvements happen.
Read more...

Merchant's Corner

Local businesses have a strong stake in well cared-for streets.
Read more...

Developer Requirements

Private development is a significant contributor of street improvements.
Read more...

Need Help? Go to 311

311 is San Francisco's 24x7 Customer Service Center

plants for all planting conditions, soils, habitat, and water use.)

DESIGN GUIDELINES

Location

Street types: Downtown Commercial; Commercial Throughway; Neighborhood Commercial; Downtown Residential; Residential Throughway; Neighborhood Residential; Mixed Use; Parkway; Park Edge; Boulevard; Alley; Shared Public Way; Paseo

Sidewalk zones: Frontage; Furnishings; Extension

See Sidewalk Landscape Permit Guidelines for full list of required design features

Additional Urban Design Guidelines

Species Selection

In addition to landscaping, street trees are strongly encouraged in sidewalk planting strips if planting areas are of sufficient width. Plant species and layout are subject to DPW Bureau of Urban Forestry's staff approval.

Planting strips should be a minimum of 3 feet wide along a street where trees are to be planted.

See Street Trees

Most plants are acceptable for sidewalk landscaping; however, ivy and other invasive groundcovers should be avoided as they can provide protective cover for pests. Tall, dense bushes and hedges should also be avoided as they can limit visibility and accessibility. Thorny and spiky plants are also not allowed.

Sidewalk landscaping should use drought-tolerant species. Deep-rooted native or drought-tolerant species have many benefits including tolerance to flooding and drought, low or no irrigation needed once established, improving water quality by filtering pollutants, and aerating and increasing the permeability of soils. Native and drought-tolerant species provide wildlife habitat and generally contribute to the health of the soil, and should be considered wherever understory landscaping projects are implemented.

If initial or ongoing irrigation is needed, the project should have access to a metered water source and seek approval from the account holder to use the water service. Contact SFPUC Customer Service to locate water service account information.

All plant species must be approved by DPW.

See Sidewalk Landscaping Recommended Drought Tolerant Plant List

Stormwater Management

Planting strips can be designed to detain, cleanse, and infiltrate stormwater. In more significant storm events, overflow from one planter can be channeled to the next.

See Stormwater Overview

Planting Along the Property Line

On streets where there is not enough sidewalk space to install sidewalk landscaping in the furnishing zone or where sidewalk width allows, planting in the frontage zone should be considered. This strategy is particularly relevant at transit stops where sidewalk landscaping otherwise cannot be placed adjacent to the street edge.

Property line planting strips that do not include trees may be as narrow as 6 to 12 inches. These can be designed as cut-outs in the sidewalk for vine plantings, or can be an area used for planter boxes or other

designed as cut-outs in the sidewalk for vine plantings, or can be above-used for planter boxes or other containers.

Shallow-rooted landscaping such as groundcovers, grasses and small shrubs should be used to minimize the risk of root damage to building foundations if there is no building setback.

Planting along the property line may also incorporate creeping vines and other similar materials to cover a building façade. Such treatments, called living walls or rain screens, if planned and designed correctly can have stormwater management value as well.

Planting in Medians and in Parking Lanes

Understory landscaping may also be included in parking lane planters and medians as follows:

Medians: Landscaping may be included in medians greater than 4 feet in width, including curbs.

Landscaping in medians is strongly encouraged wherever site conditions allow. Low maintenance, drought tolerant species are encouraged.

A 2 foot wide path clear of plantings should be provided for maintenance workers where possible. Median edge treatments, curbs, and striped areas in the roadway all may count toward this area.

See Median Greening

Parking lane: Landscaping may be included in parking lane planters with the same requirements as landscaping in sidewalk tree basins.

MAINTENANCE

With some exceptions, fronting property owners are responsible for the on-going maintenance and upkeep of sidewalk paving as well as all sidewalk elements directly fronting their property, such as trees, landscaping, and streetscape furnishings. Generally, the City is responsible to maintain roadway paving and other features in the roadway, such as medians.

Typically, if you initiate street or sidewalk improvements, you will be responsible for maintenance of those features. Specific requirements will be described in your permit.

With sidewalk landscaping, residents are required to keep planting beds free of debris and weed, and replace stolen or damaged plants or materials. On average, you may expect to spend approximately ½ hour per week to weed and remove garbage. You may also need to spend 10 to 15 minutes per week in the dry season watering the site, depending on the type of plants.

For a more detailed description of maintenance responsibilities, see Maintenance.

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831 831

Annexure A-4

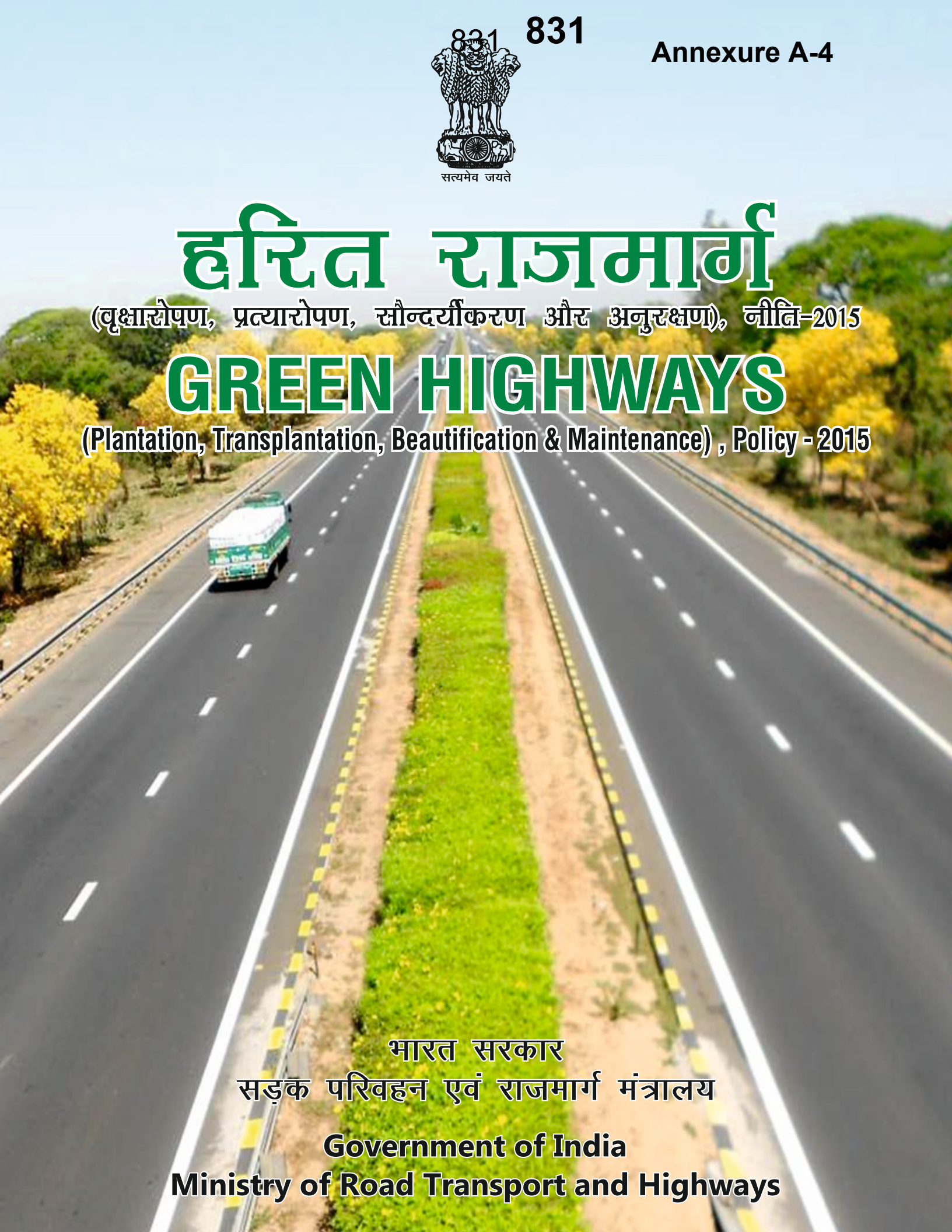
सत्यमेव जयते

हरित राजमार्ग

(वृक्षारोपण, प्रत्यारोपण, सौन्दर्यीकरण और अनुरक्षण), नीति–2015

GREEN HIGHWAYS

(Plantation, Transplantation, Beautification & Maintenance) , Policy - 2015



भारत सरकार

सड़क परिवहन एवं राजमार्ग मंत्रालय

Government of India

Ministry of Road Transport and Highways

हरित राजमार्ग
Green Highways

(वृक्षारोपण, प्रत्यारोपण, सौन्दर्यीकरण और अनुरक्षण)
(Plantation, Transplantation, Beautification & Maintenance)

नीति-2015
Policy-2015

सत्यमेव जयते

भारत सरकार

Government of India

सड़क परिवहन एवं राजमार्ग मंत्रालय

Ministry of Road Transport & Highway

नई दिल्ली

New Delhi

1. Introduction:

1.1 Loss of vegetation is one of the inevitable consequences of Highway Development. It is the responsibility of the highway development agencies to offset this loss by way of following the approach of Corridor Development & Management. The highway development agencies must strive to enhance the aesthetics of the highway corridor at all possible locations. Highways shall not be looked upon merely as a means of transportation, but an integral part and parcel of the physical environment and Socio-economic milieu.

1.2 Often, while preparing the Land acquisition Plans for the highway projects, the land needed for the avenue plantation and landscape improvement is not considered during the DPR stage. As a result, after construction, when the planting is actually to start, there is no option but to accommodate planting in whatever space available. The width of the remaining ROW is, many times, not sufficient to accommodate even a single row of plants; whereas at some places, three to four rows can be planted. In order to ensure availability of sufficient width throughout for avenue planting, it is necessary that the requirement of land for tree plantation shall be included in the Land Acquisition Plans prepared by the DPR consultants.

2. Institutional arrangements and Financing Pattern

2.1 It is experienced that the scenario of road side plantation is not satisfactory in most of the projects implemented through BOT, DBFOT and public funded projects. This is the responsibility of road implementation agencies to develop green corridor along highways for aesthetic enhancement of the project corridors and places of importance by planting selective ornamental trees, landscaping and turfing with grasses and ornamental shrubs, in order to reduce the impact of air pollution and dust as trees and shrubs are known to be natural sink for air pollutants and carbon sequencing. It also reduces noise pollution and provides much needed shade on glaring hot roads during summer. Plantation arrests soil erosion at the embankment slopes, prevents glare from the headlight of incoming vehicles and moderates the effect of wind and incoming radiation. Green corridors guide the drivers for long distance curves and openings.

will also be a member of the procurement committee. The cost of the Plantation & Maintenance will be borne from the One Percent of the Total Project Cost(TPC) earmarked and kept in a separate account with the Authorised Agency.

2.9 There will be a District level Advisory committee which will meet once in a quarter and give its recommendations/advice to the monitoring cell. The ROs/PDs of MoRTH/ NHAI in the district will be the convener of this committee.

3. Land Requirement

3.1 Based on the inventory, an action plan shall be prepared as regards additional landscaping measures and traveller amenities. If available land width is insufficient to implement this plan, acquisition of additional land shall be seriously considered keeping in view the following requirements during feasibility/DPR study:-

I. To provide flatter side slopes in cuts and fills along with contouring of the adjacent land.

II. To provide enough space for planting suitable trees and plants.

III. To provide sufficient area for parking, look out spots and other aesthetic features.

4. Plantation Agency

4.1 The entire highway network will be divided into two categories based on the legal status of the existing road-side plantations. In the first category are those areas, where plantations on the ROW have been notified as protected forests, and highway alignments passing through forest areas. For these areas, permission for tree cutting is required to be taken from the forest department under the Forest Conservation Act, 1980. While granting the permission, the forest department stipulates the conditions not only for compensatory afforestation (CA) but also for avenue plantations. In these cases, the amount for avenue plantation is deposited with the Forest Department and normally the work of avenue plantation is taken up by Forest Department apart from CA.

6. Plantation Scheme

6.1 The plantation scheme has been broadly classified into two categories which are as follows:-

a) Tree planting along the Highway Turfing with grasses and shrub/herb.

b) planting on medians/special landscapes/embankment slopes.

6.2. Selection of Tree Species for roadside plantations:

6.2.1 Plantation is one of the most important constituents of soft landscaping. Trees, shrubs and climbers have been used to enhance the soft natural ambience against harsh elements in most of the enhancement schemes. The planting species are decided based on the physical growth characteristics of trees, like form and shape, foliage pattern, growth rate, branching pattern, soil characteristics and conditions of the strip like water logged areas etc. While selecting the species of trees for landscaping, a great care shall be taken to choose the species, which already exist along the project corridor. On the other hand, if a pure avenue of single species is planted for a considerable length of the road, it gives a harmonious and pleasing look. It is, therefore, essential that mixtures of different species shall be avoided and pure avenues of a single species be planted over long stretches of road. This will enhance the aesthetic quality and will also render management easier.

6.2.2 The selection of plant types and planting arrangement shall be based on the following considerations:-

I. Aim and objective of plantation

II. Shape and size (size and spread) of the canopy

III. Texture and colour of foliage/flower/fruits in different seasons and stages of growth.

IV. Adaptability and suitability to agro-climatic regions/zones

V. Growth rate (slow/fast) average age of maturity and replacement cycle

VI. After care and maintenance required for sustenance and growth

VII. Economic and other social/recreational benefits

VIII. Drawbacks and demerits if any, like prone to insects/pests disease, animal grazing and human interference.

6.2.3 The Guidelines on Landscaping and Tree Plantation (IRC:SP:21-2009), provide for detailed specifications with respect to roadside plantations and Median Plantation.

6.3. Plantation Pattern

6.3.1 The road landscape shall be developed envisaging a holistic approach to the entire stretch. A concept shall be evolved so as to maintain visual characteristics and uniformity in terms of landscape along the stretch. In the absence of uniform land availability for the plantations, different schemes may be worked out in tune with local variations in the design. To achieve this, the entire stretch of the project corridor shall be divided into homogenous landscape sections based on similarity in terms of available width, soil conditions, climate (temperature and rainfall) and topography. A study on the local flora and vegetative cover native to these sections shall be carried out as part of the field surveys to enable a choice of the suitable species for particular section. Depending on the available ROW, plantation pattern shall be worked out as follows:-

- The first row along the Highways will be of small to medium sized ornamental trees.
- Subsequent rows depending on the availability of width will comprise of ornamental and/or shade bearing species, of more height than those in the first row. In rural sections the last row will always be of shade bearing tall trees.
- Planting of shrubs in the median.
- Planting of herbaceous species as ground cover in the median, special landscapes, and embankment slopes.
- Turfing with grass in the median, special landscapes, and embankment slopes.

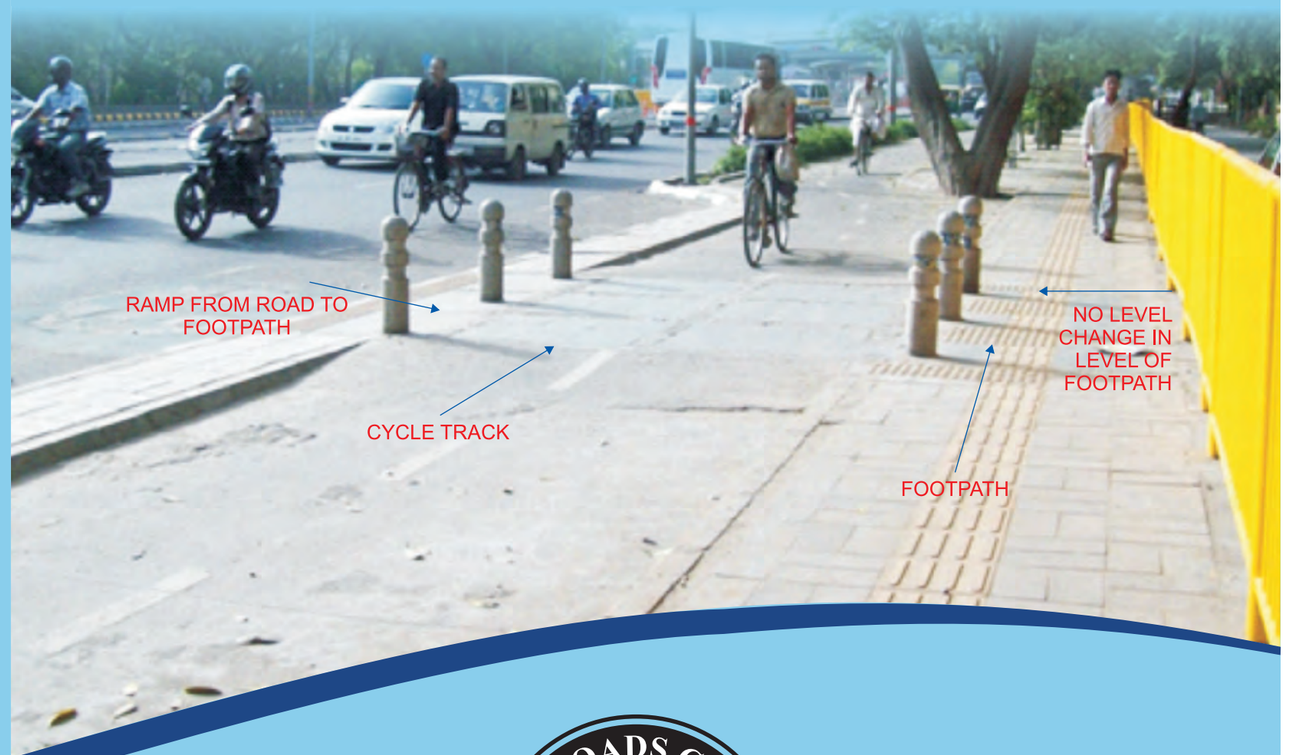
6.3.2 Table 1, 2 and 3 list a few species, which can generally be planted throughout India.

Annexure A-5

IRC:103-2012

GUIDELINES FOR PEDESTRIAN FACILITIES

(First Revision)



(The Official amendments to this document would be published by the IRC in its periodical, 'Indian Highways' which shall be considered as effective and as part of the code/guidelines/manual etc. from the date specified therein)

INDIAN ROADS CONGRESS
2012

IRC:103-2012

GUIDELINES
FOR
PEDESTRIAN FACILITIES

(First Revision)

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CONTENTS

GUIDELINES FOR PEDESTRIAN FACILITIES

1 GLOSSARY

Footpath (Footpaths)- It is a portion of right of way of road used for the movement of pedestrian traffic.

Street Crossings- It is a place where streets cross each other and includes all kind of movements of pedestrian & vechicular traffic.

School Zone Improvements- Covers engineering issues, facilities, operations, and signage as applied specifically to areas near schools.

Pedestrian Level of Service (LOS)- Pedestrian level of service indicates the environmental qualities of a pedestrian space and serves as a guide for development of standards for pedestrian facilities. Environmental factors that contribute to the walking experience and therefore to the perceived level of service, such as comfort, convenience, safety, security and attractiveness, should also be considered.

2 INTRODUCTION

2.1 The Guidelines for Pedestrian Facilities was first published in February, 1989. The work of revision of this document was taken up by the Urban Roads, Streets & Transport Committee (H-8) of the Indian Road Congress. A sub group consisting Prof. P.K. Sarkar as Chairman and Ms. Anjali Agarwal, Dr. (Mrs.) Purnima Parida and Prof. Rajat Rastogi as member was formed to revise the Guidelines. The Sub-group was benefitted with detailed inputs given by Samarthyan, National Centre for Accessibel Enivronments with all line drawings and illustrations. The revised document as prepared by the Sub-group was considered and approved by the Urban Roads, Streets & Transport Committee (personnel given below) in its meeting held on 8th September, 2011:

Sinha, Late V.K.	Convenor (till 21.12.2010)
Kurian, Jose	Co-Convenor, Convenor (w.e.f. 3.03.2011)
Joshi, Dr. G.J.	Member-Secretary

Members

Ahmad, M. Imtiyaz	Raina, Ramesh
Arasan, Dr. V.T.	Rastogi, Dr. Rajat
Bagish, Dr. B.P.	Rao, Prof. K.V. Krishna
Das, A.K.	Sagar, Sanjay
Gangopadhyay, Dr. S.	Sarkar, Dr. P.K.

teenagers, adults, elderly persons, persons with disabilities, workers, residents, shoppers or people-watchers. Pedestrian-oriented design is accessible design for all people.

3 SCOPE

3.1 Every traveller is a pedestrian at some stage of his or her travel and hence pedestrian facilities are very significant in urban transportation. In view of the paradigm shift from 'moving the vehicles' to 'moving the persons' while planning for transportation facilities in cities, provision of integrated and barrier free pedestrian facilities is essential to ensure inclusive mobility.

3.2 These guidelines cover engineering design and planning aspects of pedestrian facilities on road sides and at road crossings in urban and semi urban areas. Pedestrian facilities at special locations like schools, parking, and transit areas are also covered. Issues related to pedestrian safety audit are highlighted with respect to road safety audit.

3.3 The guidelines are intended for use by the local authorities responsible for creating and maintaining semi urban and urban road transport facilities. The guidelines are framed to serve the objectives of universal accessibility and social equity for sustainable transportation.

4 GENERAL PRINCIPLES

4.1 Pedestrian facilities should be planned in an integrated manner so as to ensure a continuous pedestrian flow. It should be useful therefore to look at pedestrian needs for an area as a whole and prepare an overall strategic plan.

4.2 The basic aim should be to reduce pedestrian conflicts with vehicular traffic to the minimum. Efforts should be made to create such conditions that pedestrian are not forced to walk in unsafe circumstances, and that the motorists respect the position of pedestrian.

4.3 While planning, the convenience of pedestrian should be a paramount consideration to ensure full utilization of the facilities.

4.4 Pedestrian facilities are a critical element in producing a pedestrian-friendly environment. A number of engineering solutions to improve the quality of the pedestrian network should take into account the following groups: children, families with young children, elderly persons, persons with disabilities, and people carrying heavy luggage.

4.5 The mobility and safety of "all" the pedestrian, including those with disabilities and reduced mobility should be ensured to promote inclusive mobility and universal accessibility.

4.6 Above all, regular maintenance of all facilities and design elements should be undertaken to maintain accessibility, reliability, usability, safety and continuity.

4.7 While planning and design the pedestrian facilities, the overall objectives would be continuity, comfort and safety

5 PEDESTRIAN LEVEL OF SERVICE

5.1 Quality of Service

Pedestrian spaces should be designed in consideration of human convenience and have to be qualitatively suitable to the needs of human beings. Nine parameters affect the quality of

service of a footpath facility out of which six are pertaining to the physical characteristics of the footpath facility, like footpath width, footpath surface, obstruction, encroachment, potential of vehicular conflict, and continuity. The three user factors are pedestrian volume, security, comfort and walking environment.

5.2 Concept of Pedestrian Level of Service

Pedestrian level of service indicates the environmental qualities of a pedestrian space and serves as a guide for development of standards for pedestrian facilities. Pedestrian spaces should be designed in consideration of human convenience and have to be qualitatively suitable to the needs of human beings. The planning and design methods for pedestrian suggested by many researchers are based primarily on vehicular traffic flow theory. Additional environmental factors that contribute to the walking experience and therefore to the perceived level of service, such as comfort, convenience, safety, security and attractiveness, should also be considered. Within the pedestrian LOS definition, six levels of service can be expressed as under:

(i) LOS A is a pedestrian environment where ideal pedestrian conditions exist and the factors that negatively affect pedestrian LOS are minimal.

(ii) LOS B indicates that reasonable pedestrian conditions exist but a small number of factors impact on pedestrian safety and comfort. As LOS A is the ideal, LOS B is an acceptable standard.

(iii) LOS C indicates that basic pedestrian conditions exist but a significant number of factors impact on pedestrian safety and comfort.

(iv) LOS D indicates that poor pedestrian conditions exist and the factors that negatively affect pedestrian LOS are wide-ranging or individually severe. Pedestrian comfort is minimal and safety concerns within the pedestrian environment are evident.

(v) LOS E indicates that the pedestrian environment is unsuitable. This situation occurs when all or almost all of the factors affecting pedestrian LOS are below acceptable standards.

(vi) At LOS F, all walking speeds are severely restricted, and forward progress is made only by shuffling. There is frequent, unavoidable contact with other pedestrian. Cross and reverse-flow movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristic of queued pedestrian than of moving pedestrian streams.

Illustrations for quantitative Pedestrian Level of Service for sidewalks and Pedestrian L.O.S. thresholds for cross walks are given in **Annexure-I**. The relationships between pedestrian flow characteristics of speed, flow and density are also illustrated in the **Annexure**.

5.3 Physical Characteristics

The pedestrian facilities shall comply with following physical characteristics:

(i) **Footpath Surface:** an even surface without cracks or bumps for comfortable walking. All surfaces should be stable, firm, and slip resistant.

(ii) **Footpath Width:** The footpath should be wide enough to accommodate pedestrian flow at any given point of time.

(iii) **Obstructions:** The obstruction can be an electric pole, tree, garbage bin, and hoardings. The location of garbage bin, electric pole and any other feature like signage etc. should be on one side of the footpath so as to give a clear walkway to the pedestrian.

(iv) **Encroachment:** The informal commercial activities are an integral part of the footpath environment in India. The pedestrian also need them as they cater to their day-to-day needs, but sometimes the extent of encroachment rises to a level that the footpath facility becomes inaccessible/ non-usable by the pedestrian. The informal sector has to be integrated in the overall design of the footpath facility by providing space for them to operate.

(v) **Potential for Vehicle Conflict:** The footpaths need to be segregated from the roads, where fast moving vehicles ply. The two ways to protect the pedestrian from vehicle conflicts is the raised footpaths and the guardrails.

(vi) **Continuity:** The continuity of the pedestrian facility is very important for the pedestrian with disability and of old age. Frequent kerb cuts along a street both impede traffic flow and create more conflict points between vehicles and pedestrian, thus reducing the effectiveness of footpaths. Frequent ups and downs make the footpath uncomfortable to use by the pedestrian especially the old and forces the pedestrian to share the carriageway along with the vehicles. The provision of kerb ramps is essential for continuity of the footpath.

5.4 User Characteristics

Following user characteristics shall be given the consideration while planning/designing pedestrian facilities:

(i) **Safety & Security:** The feeling of being secure is the most important governing factor. A pedestrian should feel safe during the day as well as night while using a footpath/crosswalk. Characteristics of this factor include provision of adequate street lighting, police patrolling during the night time and sufficient activities on the surrounding areas to ensure safety. Separation of pedestrian traffic and vehicular traffic with the provision of pedestrian's footpaths ensures safety of pedestrian and ensures less chance of pedestrian from entering the carriageway even unintentionally. It is therefore, strongly recommended that pedestrian footpaths be provided on all new facilities, and on all existing facilities as far as practicable (IRC:70-1977 "Guidelines on Regulation and Control of Mixed Traffic in Urban Areas" may be referred for this).

(ii) **Comfort:** A pedestrian needs to be protected from the inclement weather like harsh sun and rain. The trees protect the pedestrian but if planted in an unplanned manner also act as an obstruction. The location of trees

and the plants need to be carefully planned. Provision of chairs /benches, rain shelters and wash rooms is another factor that adds to the comfort of pedestrian.

(iii) **Walk Environment:** Walk environment is governed by the surroundings of the facility. The walking should be a pleasant experience. The footpath should be clean and free of stink.

6 PEDESTRIAN FACILITIES DESIGN STANDARDS

6.1 Footpath

6.1.1 Pedestrian footpaths are defined as any area primarily used by 'all' pedestrian. They can be adjacent to roadways, or away from the road.

6.1.2 Footpaths should be regarded as a transportation system which is connected and continuous, just like roadways and railways. They should not be sporadically placed where ever convenient, but instead should be provided consistently between all major attractions, trip generators, and other locations where people walk. In order to be effective, the side-walks should be provided on both sides of the road and above the level of the carriageway separated by kerbs. Height of the kerb at the edge should, however, not exceed the height of a standard public step riser i.e. 150 mm.

6.1.3 *Clear walking zone*

In the natural and tempered landscapes, paths should be at least 1800 mm wide in order to accommodate wheelchair users and persons with vision impairments assisted by a sighted person or guide dog. It will also allow, for instance, an adult and child to walk together. If existing paths are less than 1800 mm wide, provision of passing places, 1800 mm wide and 2500 mm long, shall be made at a reasonable frequency, depending on intensity of use. This will allow groups of persons to pass each other, particularly on busy routes. Where the effective width is constricted by, for example, existing trees or walls, paths may reduce to 1200 mm for short distances. A 1200 mm wide path is too narrow for persons to pass each other, hence provision of passing places should be made at a greater frequency. A change in surface at the edge, such as a grass or ground or a verge, which often occurs naturally anyway, will help to prevent persons from straying off the path.

The minimum 1.8 m (width) x 2.2 m (Height) Walking Zone should be clear of all obstructions – both horizontally and vertically. No utility ducts, utility poles, electric, water or telecom boxes, trees, signage or any kind of obstruction should be placed within the "Walking Zone" **(Fig. 1)**.

and clear outdoor passage widths needed for those people and equipment, **Annexure-I** can be referred to.

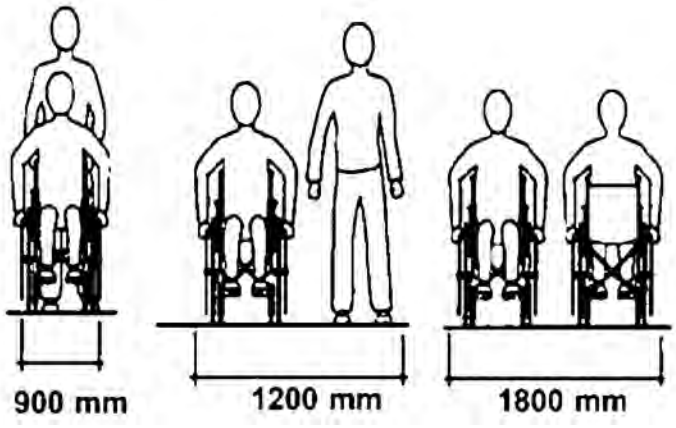

Fig. 2 Minimum Width of a Clear Footpath

6.1.5.2 Footpaths should normally be designed for a pedestrian Level of service B, thereby providing wide pedestrian facilities for pleasant and comfortable walking. Under resource constraint, Level of Service C can be adopted for deciding width of footpath **(Table 1)**. The width of the footpaths depends upon the expected pedestrian traffic and may be fixed with the help of the following guidelines subject to not being less than 1.8 m **(Table 1)**.

Table 1 Capacity of Footpath

Width of side-walk (meter)	Design Flow in Number of Persons per hour			
	In Both directions		All in One direction	
	LOS B	LOS C	LOS B	LOS C
1.8	1350	1890	2025	2835
2	1800	2520	2700	3780
2.5	2250	3150	3375	4725
3	2700	3780	4050	5670
3.5	3150	4410	4725	6615
4	3600	5040	5400	7560

The land use adjacent to roads significantly influences generation of pedestrian traffic Recommended width of footpath along various landuses are given in **Table 2.**

Table 2 Required Width of Footpath as per Adjacent Landuse

Minimum obstacle free walkway width and Residential/ Mixed Use Areas	1.8 m
Commercial/ Mixed Use Areas	2.50 m
Shopping frontages	3.5 m to 4.5 m
Bus Stops	3 m
High Intensity Commercial Areas	4 m

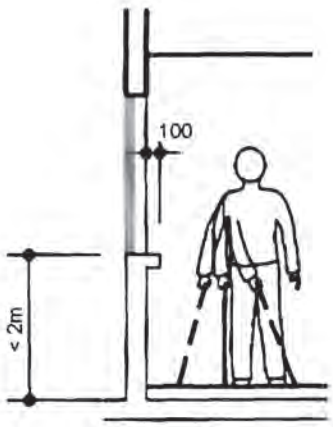

Fig. 7 Protruding Obstacles Placed in a Niche

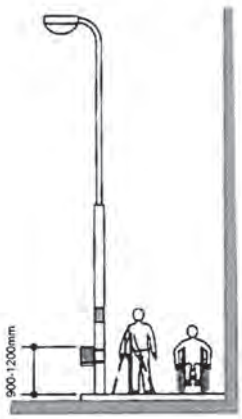

Fig. 8. Protruding Objects to be Avoided in Line of Travel

- Bollards should be painted in a contrasting colour or in coloured stripes.

6.2 Kerbs

6.2.1 *Kerb height*

Maximum height of a pavement (including kerb, walking surface, top-of-paving) shall not exceed 150 mm from the road level, which is the standard anthropometric height of a public step/ riser. Medians should be maximum 250 mm high or be replaced by crash barriers. Only along Segregated Busways/ BRT corridors, the kerb height of the Bus Stop could match the height of the bus floor.

6.2.2 *Kerb radius and slip road (left turning pocket)*

Smaller turning radii increase pedestrian safety in terms of reduction of crossing distances, increasing pedestrian visibility for drivers, decreasing vehicle turning speed; and making drivers look out for pedestrian while taking the turn **(Fig. 9)**.

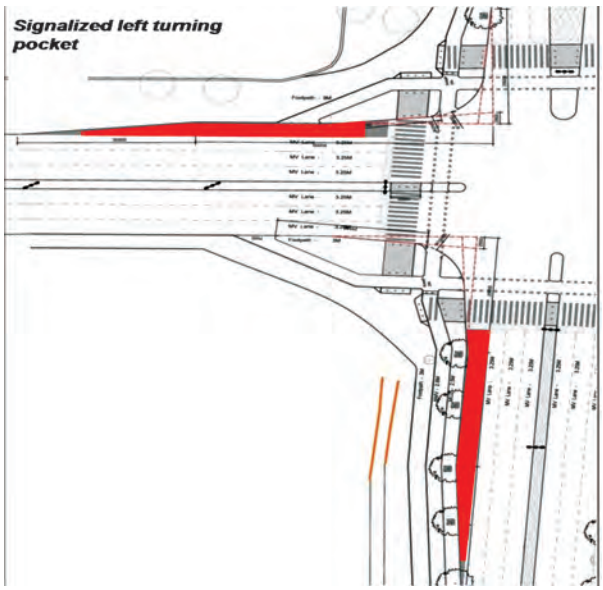

Fig. 9 Signalised Left Turning Pocket

कार्यालय वरिष्ठ प्रबन्धक (वर्क सर्किल–2)

वाटर वर्क्स कम्पाउण्ड, सैक्टर–19, नौएडा।

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पत्र संख्या नौएडा/एस0एम0(व0स0–2)/2021/.....

दिनांकः– 17/8/21

श्री कबीर सरगाना
466, सैक्टर–28, नौएडा।

विषयः– IGRS जन सुनवाई के अन्तर्गत प्राप्त शिकायतों के निस्तारण के सम्बन्ध में। शिकायत संख्याः– 60000210122118

महोदय,

कृपया उपरोक्त IGRS जन सुनवाई के अन्तर्गत प्राप्त उक्त शिकायत में आपके द्वारा सैक्टर–28,29 एवं 37 में एन0जी0टी0 आदेशो के विरूद्ध टाईल्स के कार्य को रोके जाने के सम्बन्ध में शिकायत की गई है। उक्त के क्रम में अवगत कराना है कि एन0जी0टी0 के आदेशोनुसार डस्ट फ्री जोन करने हेतु मार्ग के समीप खुले स्थानो पर स्थानीय आवश्यकतानुसार निर्धारित लम्बाई एवं चौडाई में इण्टरलोकिंग टाईल्स लगाये जाने का कार्य किया जाता है।

इसके अतिरिक्त उक्त टाईल्स लगाने से पैदल यात्रियो को भी मार्ग के एक ओर चलने में फुटपाथ जैसी सुविधा प्राप्त हो जाती है। स्थल पर पेडो हेतु भी पर्याप्त जगह को छोडा जाता है। इसी भाति सैक्टर–28,29 एवं 37 में भी स्थानीय निवासियो/आर0डब्लू0ए0 के अनुरोध पर इंटरलोकिंग टाईल्स स्थलीय आवश्यकतानुसार बिछाने का कार्य किया गया है, जो एन0जी0टी0 के डस्ट फ्री जोन के निर्देशो के अनुपालन में है।

(राहुल शर्मा)
वरिष्ठ प्रबन्धक
वर्क सर्किल–2, नौएडा।

प्रतिलिपिः–

- मुख्य महाप्रबन्धक महोदय को सादर सूचनार्थ।
- महाप्रबन्धक महोदय को सादर सूचनार्थ।
- प्रभारी (IGRS Cell) को इस आशय के साथ कि वर्क सर्किल–2 के पोर्टल से उक्त शिकायत को निक्षेपित कराने का कष्ट करें।
- प्रबन्धक (जी) को आवश्यक कार्यवाही हेतु।

17/8/21
वरिष्ठ प्रबन्धक
वर्क सर्किल–2, नौएडा।

ARUN VIHAR RESIDENTS WELFARE ASSOCIATION, NOIDA

AVRWA/127/AGM

20 Mar 2022

MINUTES OF THE ANNUAL GENERAL BODY MEETING (AGM) HELD AT 1100 HRS ON 20 MAR 2022

1. General Manager (Adm) informed the Chairman that the Quorum is Complete. 236 Members attended the AGM.

2. Before the Commencement of the Proceedings, Chairman Expressed Grief on the unfortunate Demise of 134Members /their NOKs. Two minutes silence was observed to pay homage to Departed Souls.

AGENDA POINT –I

Welcome Address By The Chairman

1. Welcoming the Members.

2. Two minutes silence for all Departed Souls, was observed. May I request GMA to read out Names. Col Rajora, esteemed MC Member also Passed Away which, is a grievous loss to us.

3. **Introduction to New Management Committee.**

1.	Mrs. Kavita Jamil	- VCP
2.	Lt Col PK Bali	- Health & Hygiene Member
3.	Brig SM Chand,VSM	- Arboriculture Member
4.	Capt Ranjit Mukherji	- Security Member
5.	Col GS Salklan	- Finance Member
6.	Col UB Singh	- Sadbhavna& Coordination Member
7.	Lt Col PK Narang	- Project & Maintenance

4. Chairman Thanked the Election Team led by Col Sohan Singh for conducting the Smooth and Fair Elections, he also thanked President AVCC Col CK Sharma and his MC for providing the Venue for the AGM.

5. **Gratitude.** Last one year we suffered terrible time, due to Covid. AVRWA. With the cooperation of ECHS & some of the Residents who have voluntarily gaven Oxygen Concentrators and Oxygen Cylinders we were able to help the Residents. Our Ward Directors at that time, did their level best to help and assist Residents. In every possible manner.

CONTRIBUTION OF AVRWA MC

6. **AVRWA Organized RTPCR/ Covaxin and Covisheild Vaccination Camps** which were held at AVCC in Oct 21. In addition to this, Booster Dose, Second Dose & Vaccination for Children were held at Door Step of our Sectors 28 & 29 in Jan 22 and soon we are planning one in Sector 37.

7. **Tree Plantation Drive in Memory of Covid Victims** was conducted by AVRWA in Ward 10 .

8. **Painting/Essay Competition on GandaNala** Conducted in all age Categories in Sep21, to create an environment of awakening before Print and Electronic Media to bring forward our agonies before the concerned administration.

9. **Non Payment of Service Tax (Legal Case):**-Since 2014 a case was pending with Service Tax Dept. where they have issued Notice, seeking payment of Service Tax Dues for various Services / Charges by AVRWA. Due to our proactive interaction this liability has been reduced from initial demand of Rs. 90 Lakhs to Rs. 20 Lakhs. We are Filing an appeal in Tribunal & this is also likely to be waived.

10. **Constitution of Committee to Oversee progress on Covering/Cleaning of Ganda Nalla.** They will to liaise with Noida Authority and related Statutory Agencies. We have raised our issues to CM Yogi Ji , Ministry of Environment, forest and climate change headed by Sh. Bupinder Yadavji. He had then immediately forwarded our case to CENTRAL POLLUTION CONTROL BOARD who issued directives to NA FOR IMMEDIATE ACTIONS. We have involved NEERI (National Environmental Engineering & Research Institute in Nagpur]. With our consistent follow ups and regular persuasion by conducting special joint meetings with NEERI scientists, NA and AVRWA GandaNalla Team, and the outcome is before you, wherein an BUGET Allocation of 16 crores for repairs and covering of Ganda Nalla has been sanctioned .

I would request the members here to kindly Ratify this committee to continue the follow up with the related agencies.

Projects executed after AVRWA's LIASION with NA

11. **Storm Water drain construction from Motor Market to Ward 2A, is completed by NA.**

12. **Sewer line laying in Ward 12A** completed, along center of the road after a huge pressure brought by the concerned Residents and AVRWA.

13. **Replacement of Electrical Meter Boxes.** This is underway access all Wards. 60 Meter Boxes have been replaced. This will be on going in 2022 also. 42 Junction Boxes have also been replaced. Work is under progress.

14 **Sports facilities by NA** . Open Gyms in Wards - 3A, 9, 11A established by Noida Authority.

15. **Sports complex** has been approved by NA in Ward 10. Soon the work will commence, by NA.

16. **Sports facilities by AVRWA** -Provision of 16 TT Tables in Wards, and installation of other Sports facilities like Basketball Poles, Volleyball Poles, in three Wards. In future AVRWA is planning to organize Sports Tournaments to enhance these facilities in Arun Vihar.

17. **Camp for Registration of Pet Dog/Cats.** This was held on 6 Feb 22 by Noida Authority at AVRWA Nursery. As per Noida Authorities, it is Mandatory to Register all Pets.

18. **Shifting of Vending Zone** --Regular Interaction with Noida MLA ShriPankaj Singh Ji was held on several occasions, to apprise him of Grievances of Residents. Because of such Interactions the proposed "Vendor Zone" on Road Opposite Ward 11 got shifted

19. **Paving of Road Side Tiles,** Completed astride road DPS to Dadri, Godawari market to AVCC,RWA Roads From GATE NO 1 to GATE NO 3 and GATE NO 6 TO GATE NO 2. in Sector 37 Internal pavements of Ward 9 and 11A.

20. Work on Mall Road Sector 29 GATE NO 16 TO 18 and 17 is in progress

21. **FOB.** NO progress. Matter rests with Noida Authority.

22. **RTI**-NO response to RTI filed by AVRWA.

23. **Commercial Activities:** Matter is being brought to Notice of Noida Authority.

24. AVTF Team was reconstituted for better Advisory Inputs, with more Members, including doctors, IT Professionals from Arun Vihar at present we have young 35 volunteers of Arun Vihar to avail their help which was apparently felt immensely very useful specially during COVID TIMES.