Capacity Building cum Need Assessment Sensitization on Water Sensitive Urban Design and Planning

Options and Techniques for RWH in Parks

Online workshop
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Shivali Jainer
Center for Science & Environment, New Delhi
Precipitation: Rainfall

Conventional Drainage

Hydrograph:

- Peak discharge becomes larger
- Floods occur quicker due to reduced infiltration

Public open spaces:
- Attenuate flow
- Promote infiltration & groundwater recharge
Sustainable Urban Drainage systems (SUDS) manage the flooding and pollution aspects of drainage and ensure that the community and ecology are considered in SUDS design. SUDS deliver efficiently and effectively across four key criteria: —
Suggestive trail in context of parks of cities in Odisha: Swale/trench > bio-retention> recharge pit

**Recommended methods 1)**

**Swales/ infiltration trenches**
Alternative of the conventional concrete gullies and drainage systems

**Recommended methods 2)**

**Bio-retention areas/ Rain garden**
Planted areas that are designed to provide a drainage function as well as contribute to the soft landscape

**Recommended methods 3)**

**Recharge pits with recharge wells**
An artificial recharge structure that penetrates the overlying impervious horizon and provides effective access to surface water to recharge the aquifer

- Allow infiltration
- Promote low flow velocity
- Allow much of particulate load to settle down
Application of RWH/Stormwater harvesting measures on various scales

<table>
<thead>
<tr>
<th>Storm-water management</th>
<th>SDP measures</th>
<th>Single family detached dwellings</th>
<th>Commercial</th>
<th>Industrial</th>
<th>Medium and high-density residential</th>
<th>Public open space</th>
<th>Transport infrastructure</th>
<th>Waterbodies and surrounding</th>
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Refer: Pg 53 to 54 of WSUDP: A Practitioner’s Guide, Implementation of WSUDP
Swale + bioretention/rain garden in parks in context to parks in cities in Odisha

Source: Conceptual design by CSE
Combination II in context to parks in cities in Odisha

Source: Conceptual design by CSE
Combination III in context to parks cities in Odisha

Swales with trenches (only for conveyance)

Source: Conceptual design by CSE
Combination IV in context to parks in cities in Odisha

Swales > leading to raingarden > to RWH pit

Source: Conceptual design by CSE
Combination V in context to parks in cities in Odisha

Design of park-type recharge structure

Source: Functional plan for ground water recharge in NCR, 2015
1. Flowers and fruits of Melia azadirachta L.,
2. Fruit of Annona reticulata L.,
3. Fruits of Passiflora foetida L.,
4. Fruits of Terminalia bellirica (Gaertn.) Roxb.,
5. Flowers of Leonotis nepetifolia (L.) R.Br.,
6. Fruits and leaves of Saraca asoca (Roxb.) Willd.,
7. Seeds of Abrus precatorius L.,

Infiltration Systems

Highly Pervious Soils

2’ Mulch

Existing Ground

2’
Combination Filtration / Infiltration in case of high water table

- **2” Mulch**
- **2’ Drain Pipe**
- **Moderately Pervious Soils**
- **Sandy Organic Soil**
- **Existing Ground**
- **Gravel**

Diagram showing the layering of materials with a focus on infiltration and filtration mechanisms.
Following are the basic details/information that are required to be considered in the preliminary action plans before designing and implementation of any of the recommended structures.

<table>
<thead>
<tr>
<th>Data / information requirements</th>
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<tbody>
<tr>
<td>No. of Parks</td>
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<tr>
<td>The Locational details (along the geo-coordinates, if possible)</td>
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<td>Size of the Parks (in Sq. Mts.)</td>
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<td>Topography- General gradient/ slope and orientation of the park</td>
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<td>The soil condition (information on the soil profile)</td>
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<td>The storm water drains existing in or near the parks</td>
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<td>RWH structures existing in or near the parks</td>
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<td>Rainfall data of the locality</td>
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<td>Data on Aquifers: Type of Aquifer, Depth</td>
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<td>Data on Groundwater Table, Groundwater Quality</td>
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<td>Nature and type of green cover inside the park</td>
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<td>Nature and extent of land covered by the water bodies, if any, inside the park</td>
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<td>Utilities commissioned inside the parks and open spaces</td>
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<tr>
<td>Information on drinking water demand and Supply</td>
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<td>Mining activities, if any in Urban Areas</td>
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Thank you