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The Sustainable Landscape Intervention: A Comprehensive Approach

[1]Dr. Ar. Sarang Gurjar, [2]Ar. Ramesh Bhambhani

[1]Professor, [2]professor

[1]Name of Department of 1st Author,

PIADS, NAGPUR, INDIA

Abstract: This paper explores a sustainable landscape intervention designed for an industrial site, focusing on integrating ecological balance with industrial functionality. The project utilizes the site's favourable topography and geological conditions to create a landscape solution that manages water efficiently and supports local biodiversity. Central to the design is a water basin, excavated to a depth of 0.90 meter, which captures and stores rainwater for irrigation. This system ensures a consistent water supply throughout the year and contributes to a cooler, visually pleasant environment for workers.

The design emphasizes the use of native plant species, moving away from conventional manicured landscapes to adopt natural and organic forms. This approach reduces the need for lawns and paved areas, enhancing sustainability. Buffer zones are incorporated to filter pollutants and support a diverse range of flora and fauna, promoting overall environmental health. The use of sprinklers optimizes water usage, achieving a 40% reduction in consumption. Additionally, the design preserves natural groundwater recharge and maintains the site's hydrology. Overall, the intervention effectively merges ecological principles with industrial needs, resulting in a sustainable and aesthetically pleasing landscape that benefits both the environment and the industrial workforce.

Index Terms **- water management, ecological balance, sustainability**

I. Introduction

In the quest for sustainable industrial practices, integrating landscape architecture with ecological principles has emerged as a critical focus. This paper outlines a landscape intervention designed for an industrial site, emphasizing a harmonious blend of industrial functionality and environmental stewardship. The project leverages the site's natural topography and climate to create a sustainable landscape that addresses water management, supports local biodiversity, and enhances worker well-being.

II. Context and Objectives

The industrial site under discussion is situated 52 km from Nagpur off Bhandara Road, Maharashtra, a region characterized by temperate grasslands and prairies. These biomes, known for their moderate temperatures, rainfall, and vegetation dominated by grasses and shrubs, provide a unique context for the intervention. The primary objective was to develop a landscape that complements industrial activities while aligning with the local climatic and biological environment.

Key goals included:

1. Efficient water management and conservation.
2. Integration of native plant species to enhance ecological balance.
3. Creation of aesthetically pleasing and functional outdoor spaces for industrial workers.
4. Minimization of environmental impact through sustainable design practices.

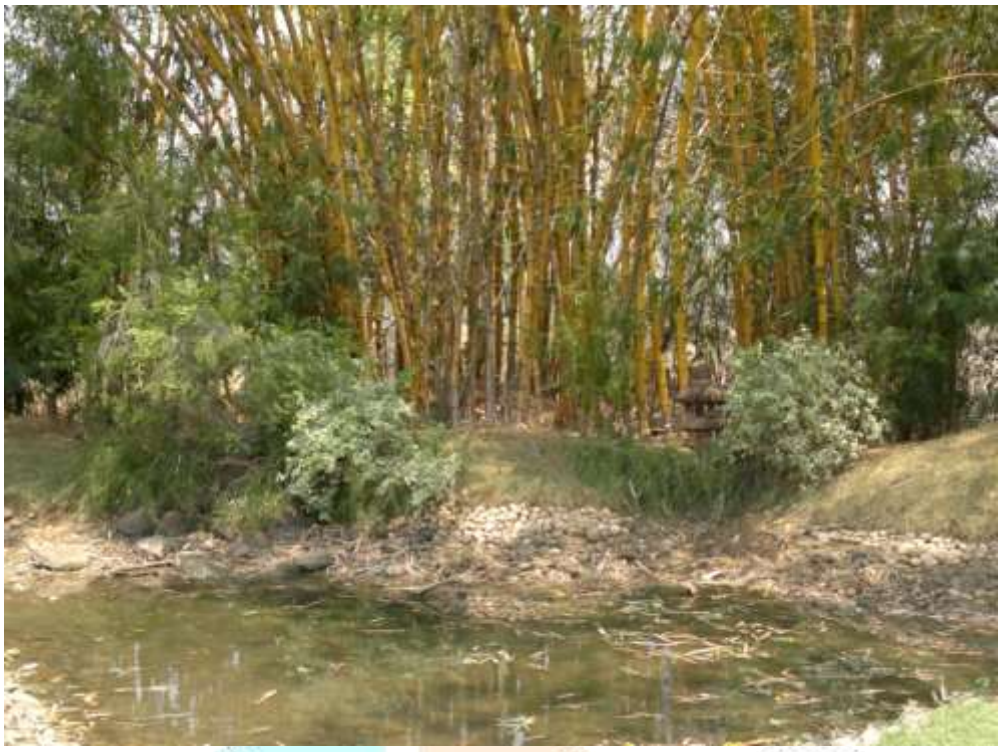
III. Design Approach

Water Management

A central feature of the landscape design is a water basin, crucial for managing the site's water resources. The basin was created through excavation to a depth of approximately 0.90 meters. The excavated soil was utilized to form surrounding mounds, which help retain water and create a plant basin. This design ensures that rainwater is captured and stored for irrigation purposes, and the surface drainage water of the site providing a consistent water supply throughout the year.

The water body, covering an area of about 60 square meters lengthwise within the 50-acre site, plays a dual role. It not only supports the irrigation needs of the vegetation but also contributes to a cooler and more pleasant environment for workers. The integration of this water feature helps mitigate the heat generated by industrial activities and offers a visually appealing landscape element.

Picture of the longitudinal water body as on 10th November 1998



Picture of the longitudinal water body as on 18th October 2009

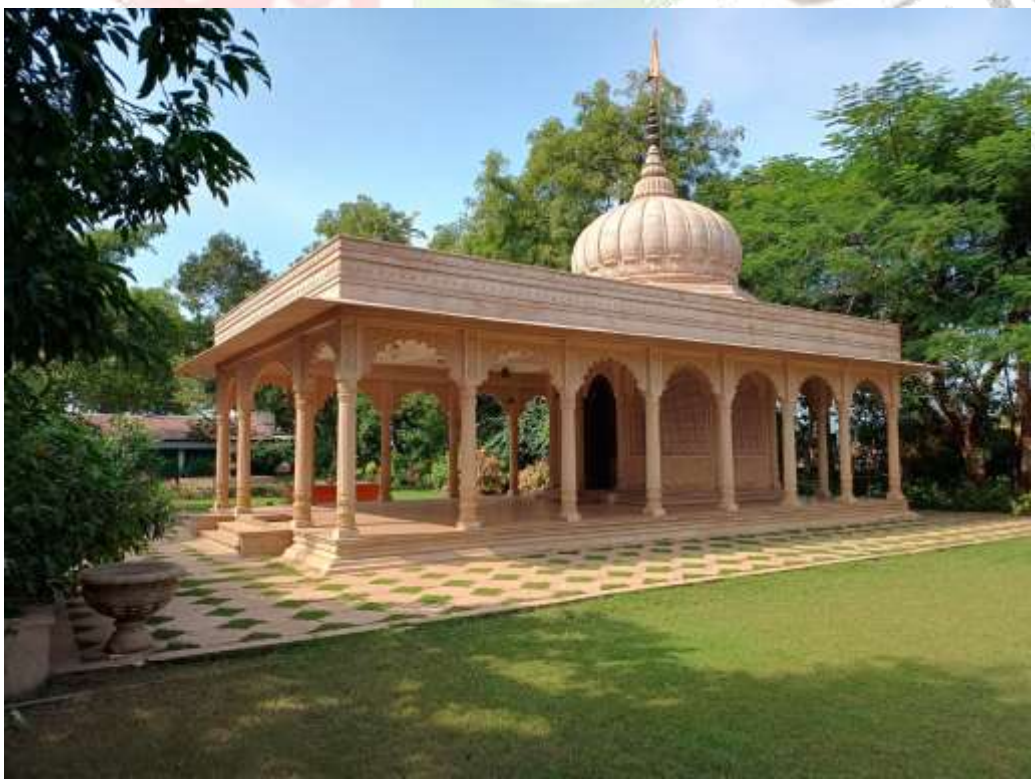
Picture of the longitudinal water body as on 19th February 2016

IV. Sustainable Landscape Solutions

The design prioritizes the use of native plant species and eschews traditional, manicured landscapes in favour of natural and organic forms. This approach involves:

- **Minimizing Lawns and Paved Areas**: The design reduces the extent of lawns and paved surfaces, which are less environmentally friendly. Instead, it incorporates native grasses, shrubs, and herbs that are well-adapted to the local climate and soil conditions.
- **Organic Forms**: The landscape features curvilinear lines and organic shapes rather than rigid geometric patterns. This not only enhances aesthetic appeal but also mimics natural ecosystems, promoting biodiversity.

Landscape Intervention as on 10th November 1998



Picture as on 6th November 2023

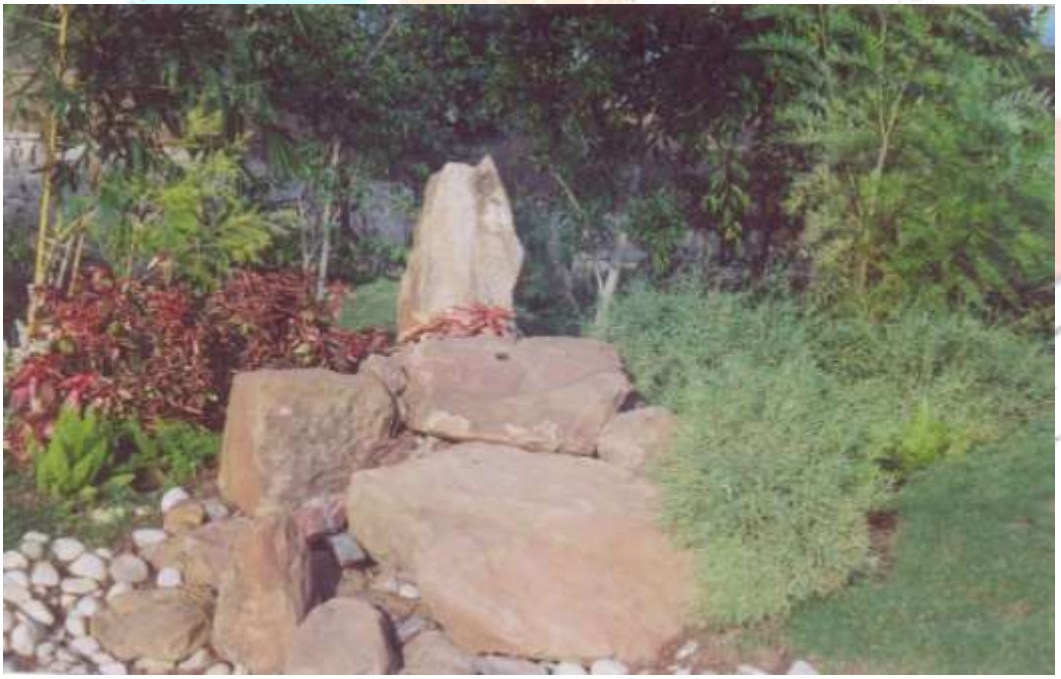
V. Buffer Zones and Pollution Control

Buffer zones are an integral component of the landscape, designed to filter pollutants and support a diverse range of flora and fauna. By planting a mix of trees, shrubs, herbs, and ground covers in a systematic manner, the design effectively intercepts and filters pollutants, improving air quality and supporting local birds. These buffer zones also contribute to the overall health of the site by mitigating the environmental impact of industrial activities.

VI. Water Conservation

Water conservation is a significant focus of the landscape intervention. The use of sprinklers is optimized to maintain adequate moisture levels in the root zone, resulting in a 40% reduction in water consumption compared to conventional irrigation methods. This efficient use of water helps ensure that the landscape remains sustainable over time.

The design also considers groundwater recharge. The water basin and surrounding mounds are strategically placed to preserve natural hydrology and support groundwater replenishment. This approach helps maintain the site's water balance and reduces the strain on local water resources.



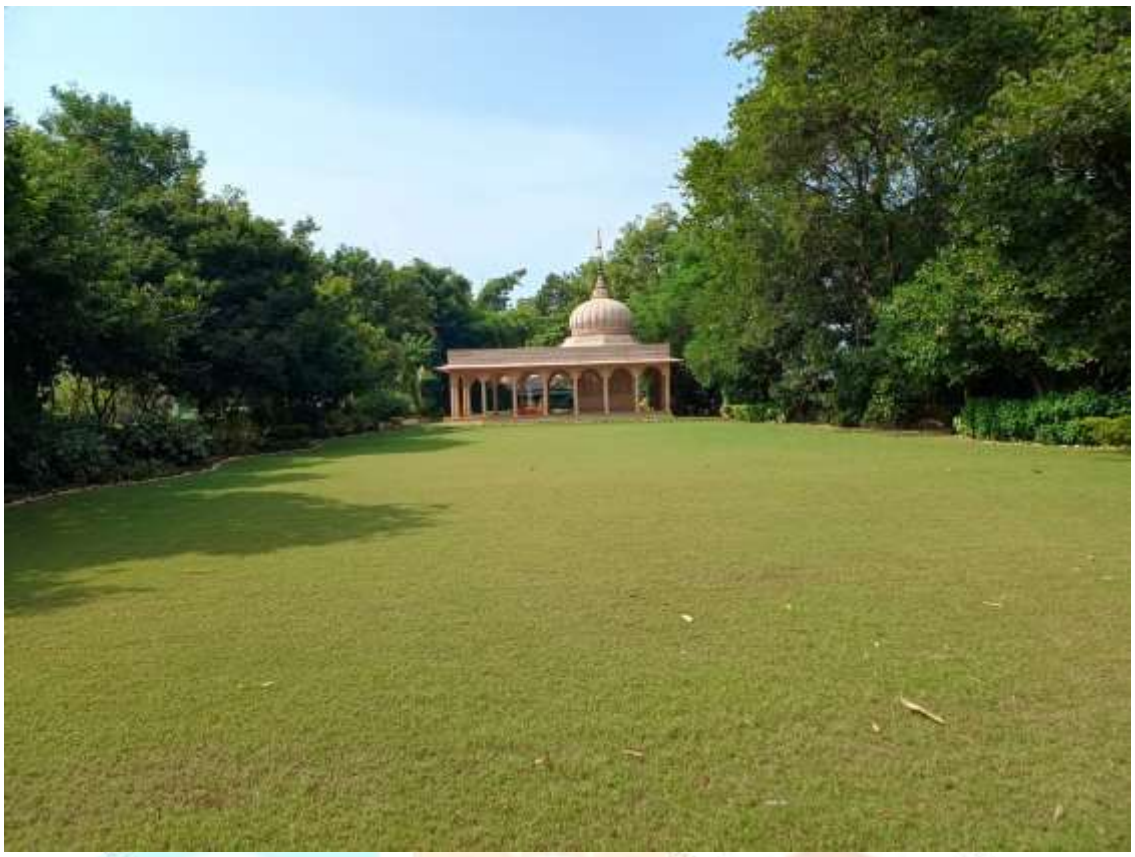
Picture of the rock formations assembled along the water body with a drilled hole.

Water spouting out of the drilled hole

VII. Biodiversity and Aesthetics

The landscape design promotes biodiversity by incorporating a diverse range of native plant species. Over time, these species have naturally evolved to form a balanced ecosystem, supporting a variety of flora and fauna. The integration of these plants enhances the visual appeal of the site and contributes to its ecological health.

The aesthetic benefits of the landscape design are evident in the visual harmony between the natural and industrial elements. The water body, with its organic shape and surrounding vegetation, creates a pleasant and inviting atmosphere for workers. This environment not only improves the overall quality of life for industrial employees but also fosters a connection with nature.



The biodiversity of mixed vegetation maturing and creating an ideal environment

VIII. Conclusion

The sustainable landscape intervention at the industrial site exemplifies a successful integration of ecological principles with industrial functionality. By focusing on efficient water management, native plant species, and effective pollution control, the design addresses key environmental concerns while enhancing the aesthetic and functional aspects of the site.

The water basin serves as a critical component of the landscape, providing essential irrigation and contributing to a more comfortable working environment. The use of native species and organic design elements supports biodiversity and reduces the environmental impact of traditional landscaping practices. Additionally, the efficient use of water and preservation of groundwater recharge demonstrate a commitment to sustainability.

Overall, this project highlights the potential for landscape architecture to contribute meaningfully to industrial settings, creating spaces that are both environmentally responsible and beneficial for their human occupants. By blending nature with industry, the design offers a model for future sustainable landscape interventions, demonstrating that industrial development and ecological stewardship can coexist harmoniously.