



MIRANDA HOUSE

UNIVERSITY OF DELHI

WATER BALANCING REPORT

2023-2024



Prepared by
EHS ALLIANCE



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CERTIFICATE



CERTIFICATE

PRESENTED TO

MIRANDA HOUSE UNIVERSITY OF DELHI

GC Narang Road, University Enclave, New Delhi, 110007

Has been assessed by EHS Alliance Services for the comprehensive study of water consumption and its impact on institutional working framework to fulfill the requirement of

WATER BALANCING REPORT

ACADEMIC YEAR 2023-24

The water conservation initiatives carried out by the institution have been verified on the report submitted and was found to be satisfactory.

The efforts taken by the management and the faculty towards water conservation and sustainability are appreciated and noteworthy.

SIGNATURE



08.09.2024

DATE OF AUDIT

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ACKNOWLEDGEMENT

EHS Alliance Services would like to thank the management of Miranda House for assigning this important work of Water Balancing assessment. We appreciate the co-operation to the teams for completion of assessment.

First of all, we would like to thank **Prof. Bijyalaxmi Nanda - Principal** for giving us an opportunity to evaluate the environmental performance of the campus.

We are also thankful to **Prof. Saloni Bahri, IQAC Coordinator**, for her continuous support and guidance, without which the completion of the project would not have been possible. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

We are also thankful to

Dr Nisha Vashistha
Prof. Rekha Kumari
Dr E. Geetanjali

Coordinator, UBA
Convenor, MH Vatavaran
Convenor, Garden Committee





DISCLAIMER

EHS Alliance Services Audit Team has prepared this report for Miranda House based on input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all sensible care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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A handwritten signature in blue ink, appearing to read 'H. Jay'.

Signature

LEAD AUDITOR



INTRODUCTION

A water analysis is an on-site survey and assessment of water-using hardware, fixtures, equipment, landscaping, and management practices to determine the efficiency of water use and to develop recommendations for improving water-use efficiency. In simple words, a water analysis is a systematic review of a site that identifies the quantities and characteristics of all the water usage. The site may differ from a public water utility, facility (institutional or commercial assets like office, college, university, malls, schools etc.) or even a household.

OBJECTIVE & SCOPE OF WORK

The chief objective of the study is to classify the water uses & water saving opportunities.

Scope of work of the study includes the following:

- Water system analysis
- Baseline water mapping quantification
- Inefficiencies and leakage quantification
- Water quality loads and discharge quantification
- Flow variability and quality parameters quantification
- Approach for water treatment, reuse or direct use
- Water balancing
- Mapping of Water quality needs at different user areas

METHODOLOGY

In this section brief about the methodology adopted for carrying out the study is to be discussed.

- Walk through the entire college to understand the nature of water uses and the systems installed in the building.
- Discussion with the administrative officers, housekeeping and kitchen employees on the various water uses during the day and the source of water.
- Regular discussions with the administrative department including the electrician, housekeeping and canteen incharge were conducted throughout the exercise on current



situation and the past trends in water consumption, current sources, supply amount, source metering, distribution, storage, wastewater generation, etc.

- For other water uses in kitchen, gardening, mopping, etc. primary data on time, patterns and frequency of water use was noted.
- The data collection and processing for personal water use including drinking, flushing and face/handwashing, mopping, gardening, utensil washing, etc. was done on the basis of actual consumption.
- One litre bottle and 10 litres bucket method were used to estimate the flow rate from various taps used for a variety of purposes. This was then calculated with the frequency of use to determine the actual water use.
- As part of the survey, staff members recorded the number of daily visits to, flushes in toilets and urinals, along with daily frequency of hand washing and average time of water flow from the taps.
- The data for all the above uses was calculated for varying time period for e.g. personal water use survey by the MH staff to calculate per capita use.

OVERVIEW OF THE COLLEGE

Miranda House, college for women, located in the University of Delhi campus, is a premier women's institution. It was established in 1948 by the then Vice Chancellor, Sir Maurice Gwyer. Lady Edwina Mountbatten laid its foundation stone on March 7 in the same year. Originally designed by renowned architect Walter George, Miranda House is built in warm red brick with cool and spacious corridors. The College shares an architectural affinity with other colonial educational institutions of the country. In the past six decades, as the College has grown, several other buildings have been added in consonance with its original design. Special efforts are on to preserve the heritage of its pristine architectural glory.

Miranda House offers liberal education in social sciences, humanities and basic sciences to more than 3500 students. The faculty, renowned for its meritorious basis profile and versatile talent, is dedicated to the cause of liberal education. Through their three years at Miranda, the students develop a sense of social responsibility, intellectual rigour, and practical knowledge. They learn communication, analytical and problem-solving skills, and a demonstrated ability to apply their education to the complex and diverse world. The College has always maintained high academic standards. More significantly, it has provided students an enabling and creative environment to freely develop and express views that help them respond to changes in society.



The College has always maintained high academic standards. More significantly, it has provided students an enabling and creative environment to freely develop and express views that help them respond to changes in society. Being on the University campus, its proximity to other colleges facilitates the participation of Miranda students in several inter-college events, both academic and cultural. Those who will make the College hostel their home for the next three years has the privilege of residing in one of the most beautiful residential buildings on the University campus. The institution's philosophy is guided by a pedagogy that encourages the students to explore new domains, to critically examine the world around them and to question stereotypes.

The Legacy... traditions and institutional values

MH has a rich legacy. Established at dawn of independence it provided a unique opportunity to young women for quality higher education. They set for themselves high goals and ideals. They worked for a new society in which women would enjoy equal opportunity with men in professional and public fields. In this, they were abetted by the founding faculty who were independent minded, and belonged to the select group of highly educated women in independent India with a deep concern for quality of education they imparted. They were also charged with a spirit of adventure, steeped in idealism, and committed to women empowerment and the task of building a nation. Proud of their mission as early pioneers, they worked with single-minded devotion in setting the Miranda traditions. These attributes of total dedication have contributed in a large measure to the position of distinction occupied by the college. Over near seven decades of its existence, the college has grown from strength to strength, continuing to provide an atmosphere of high academic excellence and rich cultural activities to its students. The college has established a niche for itself amongst the globally recognized premiere institutions of higher learning.



Being a college established and maintained by the University, Miranda House has a special place among the women's colleges of the University of Delhi. Its location in the heart of the University Campus, and its close interaction with the various Departments of the University and other campus colleges gives it a unique advantage. Although a women's college, it is not a cloister. It welcomes interaction with other colleges and educational organizations across the country, actively engaging both men and women in all its extramural activities, competing with the best on equal terms.

The extremely distinguished list of alumnae imparts a sense of confidence and immense pride in students. They view themselves as torchbearers of great traditions. All this propels them to often explore uncharted territory, think unfettered, and bend traditions in a bid to create a better world, especially for women.

Mission

The stated mission of the college is to provide

- a stimulating active learning environment attracting young women with exceptional desire to make a difference to the world
- highest quality liberal arts and basic science education through distinctive academic programmes that instill rigour in the pursuit of knowledge
- culturally sensitive inclusive environment upholding core values of respect for diversity
- enriching co-curricular activities linking education to the world of work and communities
- dedicated and responsive faculty of scholars to assist each student fulfil aspirations and reach milestones
- competencies for new domains of knowledge and the future of work in a globally connected world
- early mentoring for leadership instilling capacity to explore new ideas, take intellectual risk, and usher paradigm change

Vision



The Upanishadic maxim in the college logo “Swadhyayann pramaditavyam” enshrines Miranda House’s understanding of what education must accomplish and steers students towards introspection and self-learning. Miranda House envisions a world where women have their rightful place and are given due recognition as leaders to reach top positions in all sectors of human endeavour. To give shape to this vision, Miranda House continually reaffirms and embraces its responsibility to build on its historic legacy of leadership in the education of women. It remains strongly committed to addressing issues of gender in all their complexity and preparing young women to: lead professionally successful lives enriched by the love of learning build personally fulfilling lives radiating integrity and strength of character sustain purposeful engagement with the world with an open mind and balanced perspective develop an understanding of their duty to nation and nation-building meet with confidence the challenges they will encounter in their lives flourish in a different cultural milieu in an increasingly interconnected world uphold the core institutional values of respect for diversity, inclusiveness, and humanism to emerge as leaders charged with new ideas and the capacity to make a difference.

Facilities in the campus

Amenities at Miranda provide far more than academic and administrative facilities on campus. It is dedicated to provide students with an exceptional infrastructure for learning as well as facilities for simplifying the procurement of fundamental skills. To accomplish the goal, Miranda House offers the following :

LIBRARY: The Miranda House Library was established on 7th March 1948 and the first book was accessioned on 22nd July 1948. The foundation stone of the present building was laid by Smt. Indira Gandhi, then Prime Minister of India on 7th March 1973. The Miranda House Library preserves and provides access to a rich and enduring source of knowledge to inform, inspire and engage its users in their intellectual and creative endeavors by the well-known motto "Right Document to the Right Reader at the Right Time". It takes pride in fulfilling this inherent mission to the hilt. MH has common Digital Resource Centres with a cluster of 80 computers on LAN.

SMART CLASSROOMS: The total of 110 formal lecture spaces provide comfortable seating for 2200 students in regular classes with the potential for easily accommodating another 10% at any time. Nearly all lecture venues have neatly arranged custom designed, comfortable desks and benches with shelves for bags; teacher table and chair. Green Ceramic Board for use with dust-free chalk or White Board for use with marker pens. Roof mounted Projector, and a pull-down white display screen for multimedia projection. Custom-designed Lectors facility to link laptop to multimedia projector. Extra power outlets on front wall for flexible usage of the room. Air-conditioning was considered essential.



Library



Smart Class room



Auditorium

AUDITORIUM: Miranda House has an Auditorium with seating capacity of 450 in the Main Hall. As one of the oldest constructions in the college, it is part of the college building that was designed by Walter George. The architecture is unique. The Miranda House Auditorium and its stage bring alive nostalgic memories and are of historic importance.

MINI-AUDITORIUM: There are 170 seats in Miranda House's mini auditorium, which is arranged in steps so that everyone can see each other. The theatre has large windows that provide a lovely view of the surrounding greenery. is utilized to hold training programs, seminars, conferences, workshops, lectures, and certificate courses.

SEMINAR HALL: The Seminar Hall has a seating capacity of 125. It has a high-quality sound system, wall-mounted speakers, conference table mikes, roving mikes, lapel microphone, provision for recording; Roof-mounted high luminosity projection system. MH hosts several cultural events in its outdoor spaces like the open-air theatre, 2 arcades, cafeteria lawns, front lawns, sports ground, hostel lawns, etc. The bank foyer is periodically used for exhibitions and help desks for events. The Heritage Hall and the Student Activity Center are exquisite learning studios used extensively for organizing indoor music concerts, dance, theatre, workshops, exhibitions of photographs, paintings, art installations, prestigious public lectures, and panel discussions. They are innovatively used for baithak style gatherings.

SPORTS FACILITY: Miranda House has a Sports Ground. Facilities exist for a wide range of indoor as well as outdoor sports. The college has 14 Sport Teams and competitively participates in Archery, Athletics, Ball Badminton, Basketball, Chess, Cross-country, Netball, Power Lifting, Table Tennis, Taekwondo, Tennis, Weight Lifting, Volleyball and Yoga.



Fitness Centre



Sports ground



Cafeteria

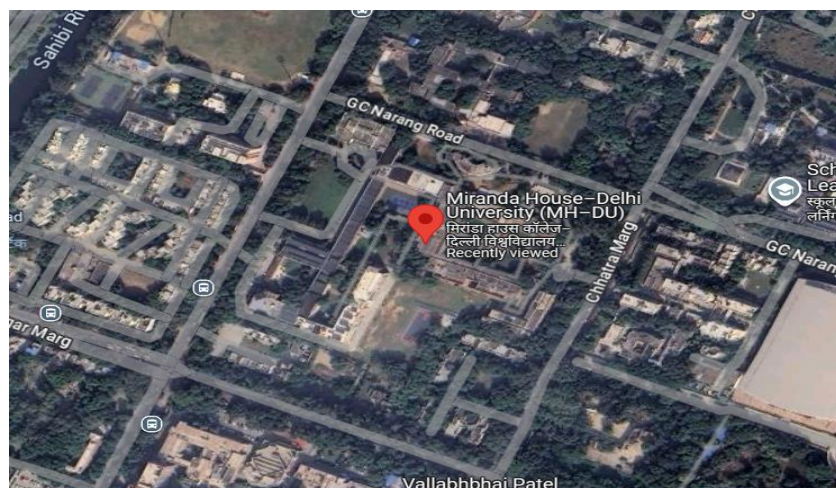
FITNESS CENTRE: MH has an active Physical Education Department that inspires the college community to work on a fitness regime and organizes several intra-college sports events, morning sessions on aerobics, yoga, recreational games, an annual sports festival, and freshers' cross-country race.

The college has an air-conditioned multigym with free weight and cardio training equipment like treadmills, cross-training gears, and bicycles. It also has 2 open gyms.

CAFETERIA: The cafeteria has been aesthetically renovated and is furnished with custom designed furniture. It includes a well-ventilated open kitchen for the preparation of certain food items, with chimney hoods above burner stoves. Utmost hygiene is maintained at the food counters, dedicated storage spaces for grocery, cookware crockery and cutlery and dishwashing area. An additional large room adjoining the main hostel kitchen and opening into the cafeteria complex is used for preparation work and most of the heavy-duty cooking. Water supply for cooking and drinking purposes is from the Hostel Reverse Osmosis Water Purification Plant.

HOSTEL: The hostel designed by the renowned architect Walter George, with the foundation stone laid by Lady Edwina Mountbatten, lends to the college a historical charm and a sense of legacy. It is laid out in an aesthetically designed quadrangle enclosing well-kept gardens paced out by a majestic bottle palm-lined pathway. The long corridors, the dining hall with a high arched ceiling, and stonework balconies add to its charm.

Geo Location
Geo Coordinates from
Google maps:
28.6926942,77.2102438





AUDIT PARTICIPANTS

On behalf of Miranda House

Name	Designation
Prof. Bijayalaxmi Nanda	<i>Principal</i>
Prof. Saloni Bahri	<i>Coordinator, IQAC</i>
Dr Nisha Vashistha	<i>Coordinator, UBA</i>
Dr. E. Geetanjali	<i>Convener, Garden Committee</i>
Prof. Pushpa Singh	<i>Member, IQAC</i>
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Dr Neeru Yadav	<i>Member, IQAC</i>
Dr Sujata Sengupta	<i>Member, IQAC</i>
Ms. Manavi Jain	<i>Member, IQAC</i>
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Mr. Sudhir Aggarwal	<i>AO, Admin</i>
Mr. Joyti Prakash	<i>Section Officer, Admin.</i>
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On behalf of EHS Alliance Services

Name	Position	Qualifications
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Ms. Pooja Kaushik	Co-Auditor	<i>M.Sc., Field Expert, QCI – WASH, PGCCC</i>



EXECUTIVE SUMMARY

This report provides a comprehensive overview of water distribution and consumption patterns at Miranda House, located in Delhi. It analyzes variations in water usage across different areas and identifies potential opportunities for reducing consumption.

The assessment focuses on both the current state of water efficiency and the existing infrastructure, highlighting areas where improvements can be made. The report emphasizes key water-saving measures that can be implemented within the institution's premises to optimize water usage. It also explores the potential for long-term water conservation strategies, considering both operational and behavioural changes.

Based on a detailed water audit conducted on 08th Sept 2024, the findings underscore the importance of proactive water management in reducing wastage and improving overall efficiency. The recommendations provided are aimed at minimizing water loss, enhancing system performance, and promoting sustainable practices among staff and students. By implementing these measures, the institution can achieve substantial water savings, reduce operational costs, and contribute to environmental sustainability. This report serves as a valuable guide in strengthening its water conservation efforts and fostering a culture of resource efficiency.

ASSESSMENT OF PRESENT WATER USAGE

1. WATER CONSUMPTION DETAILS

The major source of water in the college is through Delhi Jal Board (DJB) and borewells. The separate intake pipe lines are laid different consumption needs. Borewell water is used for gardening purpose where as supply water is used for all other applications. To make the water suitable for use, the water is treated as per drinking requirement.

The average monthly water consumption are mentioned below.

Drinking – 129.00 KL/month
Gardening – 186.24 Kl/month
Kitchen and Toilets – 1019.19 KL/month
Others – 75.33 KL/month
Hostel – 963.90 KL/Month
Total = 2373.66 KL/Month

**The calculations are as per standards of National Building Code, 2016 (NBC) Part – 11*

2. WATER STORAGE DETAILS

College stores water in overhead and underground tanks.

Storage capacity along with quantity is mentioned below.

<u>STORAGE TYPE</u>	<u>CAPACITY</u>	<u>COUNT</u>	<u>TOTAL CAPACITY</u>
OVER HEAD TANK	500	75	37500
OVER HEAD TANK	1000	19	19000
OVER HEAD TANK	2000	3	6000
OVER HEAD TANK	3000	1	3000
UNDERGROUND TANK (Fire tank)	5000	3	15000
UNDERGROUND TANK	34000	3	102000
UNDER GROUND HEAD TANK	10000	1	10000

TOTAL STORAGE CAPACITY 192500 LITRES



Saving Techniques

- MH ensures regular water tank maintenance and checks water quality standards on campus.



- *The water tanks and water coolers are checked every three months, and RO systems are regularly changed.*
- *Water Conservation awareness for new students*
- *Sprinklers usage for gardening and grass cover*

3. ENTRY AND EXIT POINTS

Entry - The primary source of water is the Delhi Jal Board (MCD) and borewells.

Exit- From Canteen, Toilets, Hostel, bathrooms and Labs through covered drainage which is connected to municipal sewage

4. Write down ways that could reduce the amount of water used in your institute

Basic ways:

- *The college ensures that the faucets in the washrooms and water filtration units are checked regularly and do not have any leakages.*
- *The college has initiated the installation of auto-push taps to reduce water wastage.*
- *The RO reject water is used in the toilets.*
- *The college has initiated growing plants native to the semi-arid regions, requiring less water to survive.*
- *Hydroponics system is installed for recycling mess grey water*

These initiatives have significantly reduced water usage on campus while promoting sustainable water management practices.

WATER CONSERVATION OPPORTUNITIES

1. STRENGTHENING OF WATER DISTRIBUTION & USAGE POINTS

Observation:

During visit, it was observed that the staff is not very much aware about the per day fresh water consumption & water meters are installed only for intake not on consumption points. The whole college may be divided in zones & separate water consumption meters to be installed for each building & there should be daily monitoring of consumption for each zone/building. The College should monitor every storage & consumption point so that there is no loss in the distribution & usage points.

Recommendations:

It is suggested to consider water as main focus area to ensure optimum utilization. There should be yearly targets to reduce the water consumption in each zone.

Implementation of the above recommendation would result in reduction in fresh water consumption and will eventually result in lesser water bill amount.

2. AWARENESS AND TRAINING ON WATER CONSERVATION

The College has total headcount of about 5367 people (Students ~ 5031 & Teaching staff ~ 262 & non-teaching staff ~ 74) and around 80% of total freshwater consumption is for domestic consumption by students & staff and in residential building. The College staff & students at all levels should be made aware and trained on **‘Water Saving & Conservation’** measures. The college should place water saving labels/posters in the college at noticeable locations like near handwashing taps; washrooms, reception office, etc. to create awareness & sense of responsibility among staff/students/visitors. Some examples of water conservation posters which may be placed are shown below for reference.



3. INSTALLATION OF FLOW RESTRICTORS OR REPLACEMENT OF INEFFICIENT TAPS

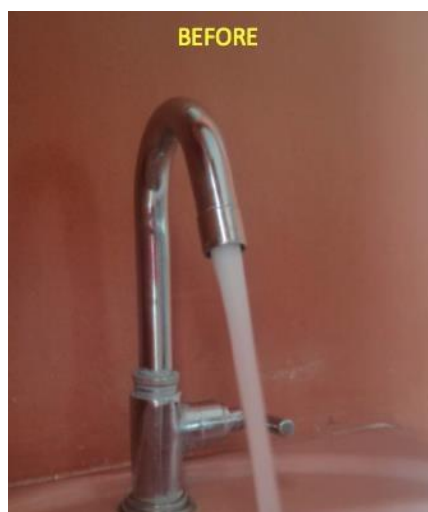
Observation:

During the audit, tap flow survey was conducted at various locations of the college. The average tap flows were around 6-8 lpm (litres per minute) with high flows up to 10 lpm. It is estimated that about 30 m³/day is being consumed in handwashing (considering at least 0.5 minutes of handwash i.e. 1.0 litres per person per day).

The college should install water efficient faucets at canteen and Hostel. The flow of these taps is < 2 lpm leading to water savings of more than 80% by these taps.

Recommendations:

It is recommended to install the flow restrictors / faucets at all the hand washing taps. Faucets and fixtures are available in the market now a days to reduce water consumptions in wash basins by reducing flow without compromising comfort level of user. This will result in savings of more than 70 percent with faucets water use. Flow regulators, especially the aerators are inexpensive and are easy to install and maintain. The images of such faucets are shown below.



4. GREY WATER & DUAL FLUSH CISTERNS FOR FLUSHING IN TOILETS

Observation: During the audit, the usage of freshwater for flushing in toilets in the college premises was observed. It was observed that both single and dual flushing systems (however less in number) were installed in the toilets.

Recommendations: It is suggested that grey water to be used in toilet flushing instead of using filtered water. It is estimated that this can save about 10 m³/day of fresh water presently used in the toilets. The investment would involve capex investment with separate pumping & piping installation and storage tank. It is also suggested to explore the possibility of replacing the grey water for flushing in campus and hostels.

5. NO FRESH WATER FOR CLEANING / GARDENING

Observation:

During the audit, it was observed that stored water from the rainwater storage tanks was being used for gardening. However, that should be used for other purposes as well such as cleaning and mopping.

Recommendations:

It is recommended to have more such water tanks for non-potable uses. Below image shows perfect example of rainwater collection, that can be used for multiple purposes.





6. MINIMIZING VISIBLE WATER LEAKAGES

(From Various Water Pipes, Water Pumps Etc.)

Observation:

At some locations, leakages were observed from the piping system and gland seal set. All the leakages when combined constitutes to a considerable amount of costly water leaking from the system.

Recommendations:

The hidden water leaks can cause loss of considerable water and energy without anyone being aware of it. A small leak can amount to large volumes of water loss. Leaks become larger with time, and they can lead to other equipment failure. The establishment of a leak detection and repair program would be the most cost-effective way to save money and water on the campus. Records of the type, location, number, and repair of leaks should be kept in a central location.

It is recommended to arrest the leakages in the system and continuously monitor the condition of the piping system to save fresh water.

Transparency of Water Balancing Report

Water audit report is one of the useful means of demonstrating an organization’s commitment to openness and transparency. If an Organisation believes it has nothing to hide from its stakeholders, then it should feel confident enough to make its water audit reports freely available to those who request them. As a basic rule, water audit reports should be made available to all stakeholders.

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******* END OF THE REPORT *******