

BEFORE HON'BLE NATIONAL GREEN TRIBUNAL

(NEW DELHI)

ORIGINAL APPLICATION NO. 170/2022

IN THE MATTER OF:

ANUPAM VERMA

.....PETITIONER

VERSUS

STATE OF UTTAR PRADESH

....RESPONDENT

PAPER-BOOK

(FOR INDEX KINDLY SEE INSIDE)

ADVOCATE FOR THE UPEIDA: PANSHUL CHANDRA

BEFORE HON'BLE NATIONAL GREEN TRIBUNAL

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Place: New Delhi
Date: 06/06/2022

Through:



(PANSHUL CHANDRA)
Advocate

BEFORE HON'BLE NATIONAL GREEN TRIBUNAL**(NEW DELHI)****Original Application No. 170/2022****IN THE MATTER OF:****Anupam Verma****Applicant****VERSUS****The State of Uttar Pradesh****Respondent****REPLY ON BEHALF OF UTTAR PRADESH EXPRESSWAYS AND
INDUSTRIAL DEVELOPMENT AUTHORITY (UPEIDA)****MOST RESPECTFULLY SHOWETH:**

1. That I Awanish Kumar Awasthi son of Aditya Kumar Awasthi aged about 59 years, Hindu by religion, Graduate by Education, Government Servant by profession, having office at C-13, 2nd Floor, Paryatan Bhawan, Vipin Khand Gomti Nagar, Lucknow, 226010 working on the post of Chief Executive Officer, UPEIDA and as such, well conversant with the facts of the case on the basis of records



Awanish Kumar Awasthi
Chief Executive Officer
Uttar Pradesh Expressways
Industrial Development
Authority (UPEIDA)

thereof, and duly authorized and competent to swear this affidavit on behalf of UPEIDA in the above matter.

2. That I have read and understood the original application and filing this Counter Affidavit as reply thereto.
3. That the contents of the application that have not been specifically admitted hereunder shall be deemed to have been denied.
4. That the deponent craves liberty to raise additional submission or file additional affidavits in case need arises during the course of arguments.

5. **Brief Submissions: -**

A. That the answering respondent is an Authority setup by the Government of Uttar Pradesh under U.P Industrial Area Development Act. 1976, vide notification 4246/77-4-07-94 Bha/07TC, dated 27/12/2007 issued by Industrial Area Development Department-4, Government of Uttar Pradesh. The true copy of the Notification dated 27/12/2007 is annexed herewith and marked as **Annexure A/1**.

B. That the answering respondent was nominated as Nodal Agency for the development of Purvanchal Expressway vide Notification no. 2742/77-3-17-502M/14 TC dated 04/12/2017 issued by State Government of Uttar Pradesh . The true copy of the Notification


Vishwanish Kumar Awasthi
Chief Executive Officer
Uttar Pradesh Expressway
Industrial Development
Authority (UPEIDA)

dated 04/12/2017 is annexed herewith and marked as **Annexure A/2.**

- C. The answering respondent is a government agency and it abides by the law of the land and has successfully constructed state of the art infrastructure projects like Agra-Lucknow Expressway, Purvanchal Expressway and Bundelkhand Expressway etc. following and complying with the Forest and Environmental norms laid down by the State and the Central government, Moreover it has obtained all prerequisites clearances and permissions from the competent authorities before starting the construction of the project in question.
- D. That Purvanchal Expressway is starting from NH-731, district Lucknow and ending at Haidaria, in district Ghazipur, passing through the districts Lucknow, Barabanki, Amethi, Sultanpur, Ayodhya, Ambedkar Nagar, Azamgarh, Mau, Ghazipur covering the length of approximately 340.824 KM
- E. That the answering respondent has made the provisions for rain water harvesting for the project in question in accordance with Guidelines for Expressways Volume-II published by Indian Roads Congress on behalf of Ministry of Road Transport & Highways,


(Awanish Kumar Awasthi)
Chief Executive Officer
Uttar Pradesh Expressway
Industrial Development
Corporation Ltd.

Volume-II:design, Appendix -7 / Page II-186 to II-189, addressing the following issues :-

- Enhance the sustainable yield in areas where over development has depleted the aquifer.
- Enhance the rainfall runoff, since this is going to sewer or storm Water drain.
- Conservation and storage of excess surface water for future requirements, since these requirements often change within a season or a period.
- Surface water is inadequate to meet our demand and we have to depend on ground water.

The true copy of the Appendix 7 of Guidelines for Expressways Volume –II is annexed herewith and marked as **Annexure A/3**.

F. That IS Code 15797 pertains to "Roof Top Rain Water Harvesting" in which specific guidelines have been provided for Roof Top rain water Infiltration into the ground for recharging of ground water. The scope of IS 15797 has been narrated in page 1 of the IS Code as "*The standard lays down guidelines for roof top rain water harvesting.*" A true copy of IS 15797 is annexed herewith and marked as **Annexure A/4**.


Chandran Kumar Awasthi
Chief Executive Officer
Uttar Pradesh Expressways
Industrial Development
Corporation

G. However, the Purvanchal Expressway passes through rural areas of Uttar Pradesh so the relevant norms as narrated in Guidelines for Expressways Volume-II by Ministry of Road and Transport have been followed by the answering Respondent.

H. That the answering respondent has the Forest Clearance for the project in question from Ministry of Environment, Forests and Climate Change, Government of India vide letter no. 8B/UP/06/01/2018/FC/864 dated 09/03/2018 and Environment Clearance from Directorate of Environment, Uttar Pradesh vide Reference no. 380/Parya/SEAC/3696/2016 dated 22.03.2017. The true copy of Ministry of Environment, Forests and Climate Change Environment Clearances and true copy of clearance from Directorate of Environment, Uttar Pradesh are attached herewith and marked as **Annexure A/5&6** respectively.

I. That the contents of the present affidavit are true and correct to the 'best of my knowledge which is based on the official record available in my office. Nothing material has been concealed there from nor any part of it is false.



DEPONENT

Sanish Kumar Awasthi,
Chief Executive Officer,
Uttar Pradesh Expressway
Industrial Development
Authority (UPEIDA)



VERIFICATION

Verified at Lucknow, on this the 06 day of June, 2022 that the

contents of the above Affidavit are true and correct to my knowledge. No part of it is false and nothing material has been concealed there from.

DEPONENT

(Awanish Kumar Awasthi)
Chief Executive Officer
Uttar Pradesh Expressways
Industrial Development
Corporation (UPEIDA)

Through:

(PANSHUL CHANDRA)

Advocate



Place: Lucknow

Dated: 06/06/2022

Place: Lucknow

Dated: 06/06/2022

Solemnly affirmed before me in office today,
at..... by.....

who is identify by.....
Clerk to Sri.....

I have satisfied.....
deponent that the.....
of this affidavit which has.....
explained by me Fee Charged Rs.....

R. P. SINGH
Oath Commissioner
Sadar Teh. Lucknow

I Identified the Deponent/Exhibitor
Who Has Signed 'Cur' Before Me



संविधान संशोधन-जी०-११/लाई०-

नृज पोषण/११/०५-०६

लाईसेन्स टू पोस्ट ऐट कन्सेशनल रेट

सरकारी गजट, उत्तर प्रदेश

उत्तर प्रदेशीय सरकार द्वारा प्रकाशित

असाधारण

विधायी परिशिष्ट
भाग-४, खण्ड (ख)
(परिनियत आदेश)

लखनऊ, बृहस्पतिवार, २७ दिसम्बर, २००७

पीप ०, १९२१-सक सामत्

उत्तर प्रदेश सरकार
औद्योगिक विकास अनुभाग-४

संख्या ४२४०/७७-४०७-१४ भा /०७ टी०सी०
लखनऊ, २७ दिसम्बर, २००७

अधिसूचना

प०आ०-६६८

उत्तर प्रदेश औद्योगिक क्षेत्र विकास अधिनियम, १९७६ (उत्तर प्रदेश अधिनियम संख्या ६, सन् १९७६) की धारा ३ के अधीन शक्ति का प्रयोग करके, राज्यापाल गेट नोएडा से बलिया तक आठ लेन के एक्सप्रेस-वे और लिंक एक्सप्रेस-वे परियोजना (औद्योगिक विकास क्षेत्र) के स्वामित्व एवं क्रियान्वयन हेतु एक प्राधिकरण का गठन करते हैं, जिसे "उत्तर प्रदेश एक्सप्रेस वेज औद्योगिक विकास प्राधिकरण" कहा जायेगा, जिसमें निम्नलिखित होंगे:-

- | | | |
|-----|---|------------|
| (क) | अध्यक्षता एवं औद्योगिक विकास आयुक्त उत्तर प्रदेश शासन। | अध्यक्ष |
| (ख) | प्रमुख सचिव, लोक निर्माण विभाग, उत्तर प्रदेश शासन या उनके द्वारा नामित व्यक्ति जो संयुक्त सचिव से नीचे का न हो। | सदस्य |
| (ग) | प्रमुख सचिव, आवास विभाग, उत्तर प्रदेश शासन या उनके द्वारा नामित व्यक्ति जो संयुक्त सचिव से नीचे का न हो। | सदस्य |
| (घ) | प्रमुख सचिव, वित्त विभाग, उत्तर प्रदेश शासन या उनके द्वारा नामित व्यक्ति जो संयुक्त सचिव से नीचे का न हो। | सदस्य |
| (ङ) | प्रमुख निदेशक, उत्तर प्रदेश राज्य औद्योगिक विकास निगम लि०, कानपुर। | सदस्य |
| (च) | मुख्य कार्यपालक अधिकारी, उत्तर प्रदेश एक्सप्रेस-वेज औद्योगिक विकास प्राधिकरण। | सदस्य-सचिव |

२. उपर्युक्त प्राधिकरण का मुख्यालय लखनऊ में होगा।

आज्ञा से,

राम बाल सिंह,

निर्देशक सचिव।

उत्तर प्रदेश असाधारण गजट, 27 दिसम्बर, 2007

In pursuance to the provisions of clause (3) of article 348 of the constitution, the Governor is pleased to order the publication of the following English translation of notification no. 4246/LXXVII-4-07-94 bha-07 TC, Dated December 27, 2007.

Notification

No. 4246/LXXVII-4-07-94 bha-07 TC
Dated Lucknow, December 27, 2007

IN exercise of the powers under section 3 of the Uttar Pradesh Industrial Area Development Act, 1976 (U.P. Act No. 5 of 1976), the Governor is pleased to constitute an authority to be called as the "Uttar Pradesh Expressways Industrial Development Authority" for Ownership & execution of eight Lane Expressway from Greater Noida to Balia & Link Expressway project (The Industrial Development area), consisting of the following namely:-

- | | | |
|-----|---|------------------|
| (a) | The Infrastructure & Industrial Development Commissioner to the Government of Uttar Pradesh. | Chairman |
| (b) | The Principal Secretary to the Government of Uttar Pradesh in Public Works Department or his nominee not below the rank of Joint Secretary. | Member |
| (c) | The Principal Secretary to the Government of Uttar Pradesh in Avas Department or his nominee not below the rank of Joint Secretary. | Member |
| (d) | The Principal Secretary to the Government of Uttar Pradesh in Finance Department or his nominee not below the rank of Joint Secretary. | Member |
| (e) | The Managing Director, Uttar Pradesh State Industrial Development Corporation. | Member |
| (f) | The Chief Executive Officer, Uttar Pradesh Expressways Industrial Development Authority. | Member-Secretary |
2. The headquarter of the aforesaid Authority shall be at Lucknow

By order,
RAM PAL SINGH
Vishesh Sachiv

(Handwritten Signature)

उत्तर प्रदेश शासन
औद्योगिक विकास अनुभाग-3
संख्या-2742/77-3-17-502एम/14 टी सी.
लखनऊ: दिनांक: दिसम्बर 4, 2017

अधिसूचना

उत्तर प्रदेश साधारण खण्ड अधिनियम, 1904 (उत्तर प्रदेश अधिनियम संख्या-1, सन् 1904) की धारा-21 के साथ पठित उत्तर प्रदेश औद्योगिक क्षेत्र विकास अधिनियम, 1976 (उत्तर प्रदेश अधिनियम संख्या-6, सन् 1976) की धारा-3 के अधीन शक्तियों का प्रयोग करके, राज्यपाल समय-समय पर यथा-संशोधित सरकारी अधिसूचना संख्या-4246/77-4-07-94भा0-07टी0सी0, दिनांक 27 दिसम्बर, 2007 में निम्नलिखित संशोधन करते हैं :-

संशोधन

पूर्वोक्त अधिसूचना में, अंक और शब्द "अपर गंगा नहर के दांये तट पर सनौटा सेतु (जिला-बुलन्दशहर) से उत्तर प्रदेश-उत्तराखण्ड सीमा के पूर्व पुरकाजी (जिला-मुजफ्फरनगर) के निकट तक 08 लेन प्रवेश नियंत्रित एक्सप्रेसवे एवं लिंक एक्सप्रेसवेज (मेरठ एयरपोर्ट लिंक, देवबंद लिंक, एन0एच0-24 मसूरी एवं भविष्य में 25 किमी0 लम्बाई के 02 लिंक); जल विद्युत गृह (नीरगाजनी, जौली, चित्तौड़, सलावा, भोला, जानी एस्केप एवं डासना), जल परिवहन सुविधा (ऐच्छिक) एवं लैण्ड पार्सल (ऐच्छिक) का विकास, क्षेत्र के सुनियोजित औद्योगिक एवं नगरीय विकास हेतु" "आगरा से लखनऊ प्रवेश नियंत्रित एक्सप्रेसवे (ग्रीन फील्ड) परियोजना" के पश्चात शब्द "पूर्वांचल एक्सप्रेसवे परियोजना" (औद्योगिक विकास क्षेत्र) बड़ा दिए जायेंगे।

4.12.2017
(जयनीश कुमार अधिकारी)
मुख्य कार्यपालक अधिकारी
उत्तर प्रदेश एक्सप्रेसवेज औद्योगिक
विकास प्राधिकरण (एपीडी)

नरेन्द्र सिंह पटेल
विशेष सचिव।

व. अ. गुप्ता

11 .

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Ministry of Road Transport & Highways

Guidelines for Expressways

PART - I

Volume - I : Planning

Volume - II : Design

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Ministry of Road Transport & Highways

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APPENDIX-7

RAINWATER HARVESTING AND CONSERVATION

- Source: (i) *Rain Water Harvesting and Conservation Manual, Government of India, Consultancy Services Organisation, Central Public Works Department, Nirman Bhawan, New Delhi – 110011, and*
(ii) *IRC:SP:50 Guidelines on Urban Drainage.*

Rain water harvesting and Conservation, is the activity of direct collection of rain water. The conservation of rain water so collected can be stored for use or can be re-charged into the aquifer. The main goal is to minimize flow of rain water through drains to the outfall without making any use of the same. It is well known that the groundwater level is depleting and getting lower and lower in the last decades.

The Artificial recharge technique should normally address the following issues:

- i) Enhance the sustainable yield in areas where over development has depleted the aquifer.
- ii) Enhance the rainfall runoff, since this is going to sewer or storm Water drain.
- iii) Conservation and storage of excess surface water for future requirements, since these requirements often change within a season or a period.
- iv) Surface water is inadequate to meet our demand and we have to depend on ground water.

These issues can be addressed by adopting the following forms.

(A) Recharge Pit

- i) Recharge pits are constructed recharging the shallow aquifer.
- ii) These are constructed generally 1 to 2 m wide and 2 to 3 m deep.
- iii) After excavation, the pits are refilled with pebbles and boulders.
- iv) Water to be recharged should be silt free as far as possible.
- v) Cleaning of the pit should preferably be done once a year.
- vi) It is suitable for small buildings having roof top area upto 100 sqm.
- vii) Recharge pit may be of any shape i.e. circular, square or rectangular.

Drainage and Erosion Protection

- viii) The run off of 1st rain should not be allowed to percolate to the rain water harvesting structure and it be allowed to go to the drain by making suitable bypass arrangement in water carrying pipe systems.
- ix) If the pit is of trapezoidal shape, the side slopes should be steep enough to avoid silt deposition.

(B) Recharge Trench

- i) It is constructed when permeable strata of adequate thickness are available at shallow depth.
- ii) It is a trench of shallow depth filled with pebbles and boulders.
- iii) These are constructed across the land slope.
- iv) The trench may be 0.5 to 1 m wide, 1 to 1.5 m deep and 10 to 20 m long depending upon the availability of land and roof top area.
- v) It is suitable for the buildings having roof area of 200 to 300 sqm.
- vi) Cleaning of trench should be done periodically.

(C) Gravity Head Recharge Well

- i) Bore wells/tube wells can be used as recharge structure.
- ii) This technique is suitable where
 - a) Land availability is limited
 - b) When aquifer is deep and over land by impermeable strata (clay)
- iii) The roof top Rain Water is channelised to the well and recharges under gravity flow condition.
- iv) Recharge water should be silt free as far as possible.
- v) The well can also be used for pumping.
- vi) Most suitable for the areas where Ground Water levels are deep.
- vii) The number of recharging structures can be determined in limited area around the buildings depending upon roof top area and aquifer characteristics.
- viii) The run off of 1st rain should not be allowed to percolate to the rain water harvesting structure and it be allowed to go to the drain by making suitable bypass arrangement in water carrying pipe systems.

Guidelines for Expressways VOLUME-II: DESIGN**(D) Recharge Shaft**

- i) A recharge shaft is dug manually or drilled by the reverse/direct rotary method.
- ii) Diameter of recharge shaft varies from 0.5 to 3 m depending upon the availability of water to be recharged.
- iii) It is constructed where the shallow aquifer is located below clayey surface.
- iv) Recharge shaft is back filled with boulders, gravels and coarse sand.
- v) It should end in more permeable strata (sand).
- vi) Depth of recharge shaft varies from 10 – 15 m below ground level.
- vii) Recharge shaft should be constructed 10 to 15 m away from buildings for the safety of building
- viii) It should be cleaned annually preferably by scrapping the top layer of sand and refilling it accordingly.

Any of the above system can be integrated with the roadside surface drainage. A typical arrangement is shown in Fig. 7-A-1 Rainwater Harvesting Arrangement.

15

Drainage and Erosion Protection

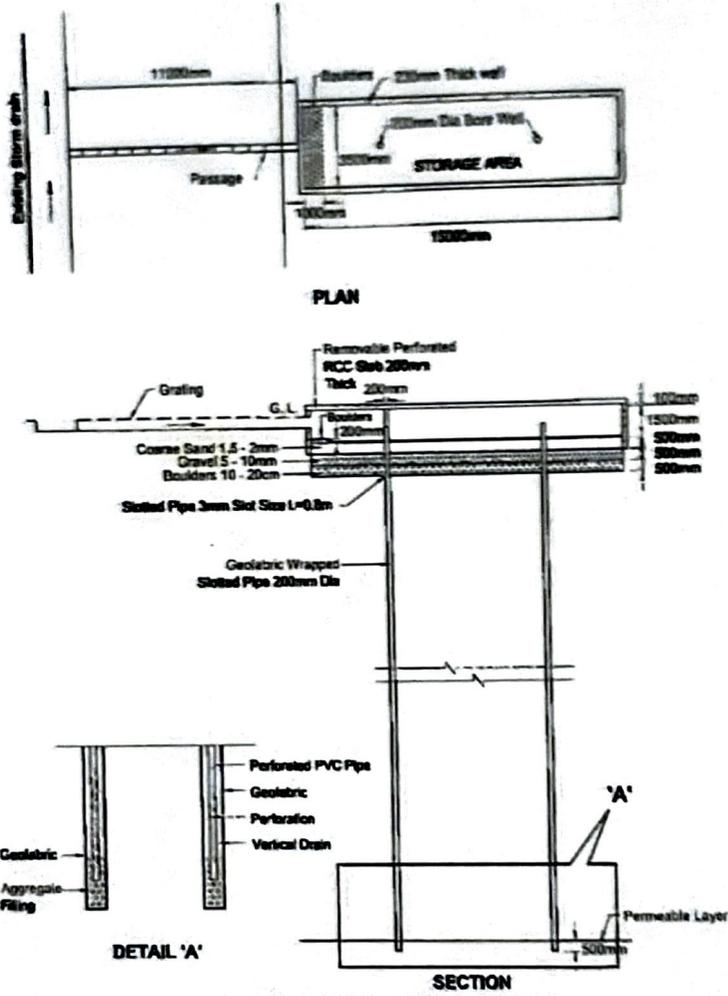


Fig. 7-A-1 Rain Water Harvesting Arrangement

Omur

IS 15797 : 2008

भारतीय मानक
छतों पर वर्षा जल संग्रहण — मार्गदर्शी सिद्धान्त

Indian Standard
ROOF TOP RAINWATER
HARVESTING — GUIDELINES

ICS 13.060.10

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 2008

Price Group 7

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Ground Water and Related Investigations Sectional Committee had been approved by the Water Resources Division Council.

Rainwater harvesting is an option which has been adopted in many parts of the world where due to increase in population conventional water supply system has failed to meet the needs of the people. The term 'Water Harvesting' connotes collection and storage of rainwater and also other activities aimed at harvesting surface water, prevention of loss through evaporation and seepage.

Natural recharge to ground water has reduced due to shrinkage of open area consequent to increased urban activities. Ground water levels have registered a marked decline, unplanned disposal of waste has resulted in deterioration of ground water quality. In view of the gap between demand and supply there is an utmost need for adopting roof top rainwater harvesting and augmenting ground water storage.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ROOF TOP RAINWATER HARVESTING — GUIDELINES

1 SCOPE

This standard lays down guidelines for roof top rain-water harvesting.

2 REFERENCE

The following standard contains provision, which through reference in this text constitutes provision of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard given below:

IS No.	Title
14476 (Part 6) : 1998	Test pumping of water wells — Code of practice: Part 6 Special tests

3 GENERAL

Roof top rainwater collection is one of the solutions for solving or reducing the problem of water availability, where there is inadequate ground water supply and surface sources are either lacking or insignificant. In this system, rainwater falling on roofs of houses and other buildings is collected through a system of pipes and semi-circular channels of galvanized iron or PVC and stored in tanks suitably located on the ground or underground for direct use or for recharging ground water aquifers. Urban housing complexes/residential buildings and institutional buildings have large roof area and are amendable for rainwater harvesting. This practice is in vogue at the individual household level in remote hilly areas with high rainfall and in some semi-arid areas in the plains.

4 ADVANTAGES OF ROOF TOP RAINWATER HARVESTING

- a) One of the appropriate options for augmenting ground water recharge/storage in urban areas, where natural recharge has been considerably reduced due to increased urban activities and not much land is available for implementing any other artificial recharge measure. In rural areas also, roof top rainwater harvesting can supplement the domestic requirements.
- b) Rainwater runoff, which otherwise flows through sewers and storm drains and is wasted, can be harvested and utilized.

- c) Helps in reducing the frequent drainage congestion in urban areas where fast rate of urbanization has reduced availability of open surfaces.
- d) Recharging of aquifers with harvested water improves the quality of ground water through dilution.
- e) The harnessed rainwater can be utilized when needed at the time and place of scarcity.
- f) The structures required for harvesting are simple, economical and Eco-friendly.
- g) In coastal areas over extraction of ground water leads to saline water ingress. Therefore, recharging of ground water aquifer in such areas helps to control saline water ingress.
- h) Storing of harvested water under ground through aquifer recharge, wherever feasible, is advantageous as such storage is not exposed to evaporation and pollution. Aquifers serve as a distribution system as well supplying water when required.

5 FACTORS DETERMINING TYPE/SYSTEM OF RAINWATER HARVESTING

5.0 There are many factors that determine the total quantity of rainwater that can be harvested in a particular area and the system that would be appropriate for efficiently harvesting this quantity. Some of these are given in 5.1 to 5.5.

5.1 Rainfall Quantity

The total volume of rainwater available from any roof top surface is a product of total rainfall and the surface area of collection. A runoff coefficient is usually applied to account for infiltration, evaporation and other losses and it varies from 0.8 to 0.95. In order to estimate the average annual/monsoon runoff from rooftop area in any location, the average annual/monsoon rainfall data for the location need to be used and using Tables 1 and 2, the water availability for flat and sloping roof can be worked out.

5.2 Rainfall Pattern

Rainfall pattern as well as total rainfall, will often determine the feasibility of a rainwater harvesting system. In areas where rainfall occurs regularly in most parts throughout the year, implies that the storage requirement is low and hence the system cost will be

Table 1 Water Availability for a Given Roof Top Area and Rainfall (For Flat Roofs)
(Clause 5.1)

Sl No.	Roof Top Area m ²	Rainfall, mm												
		100	200	300	400	500	600	800	1 000	1 200	1 400	1 600	1 800	2 000
(1)	(2)	Water availability (m ³)												
		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
i)	20	1.6	3.2	4.8	6.4	8	9.6	12.8	16	19.2	22.4	25.6	28.8	32
ii)	30	2.4	4.8	7.2	9.6	12	14.4	19.2	24	28.8	33.6	38.4	43.2	48
iii)	40	3.2	6.4	9.6	12.8	16	19.2	25.6	32	38.4	44.8	51.2	57.6	64
iv)	50	4	8	12	16	20	24	32	40	48	56	64	72	80
v)	60	4.8	9.6	14.4	19.2	24	28.8	38.4	48	57.6	67.2	76.8	86.4	96
vi)	70	5.6	11.2	16.8	22.4	28	33.6	44.8	56	67.2	78.4	89.6	100.8	112
vii)	80	6.4	12.8	19.2	25.6	32	38.4	51.2	64	76.8	89.6	102.4	115.2	128
viii)	90	7.2	14.4	21.6	28.8	36	43.2	57.6	72	86.4	100.8	115.2	129.6	144
ix)	100	8	16	24	32	40	48	64	80	96	112	128	144	160
x)	150	12	24	36	48	60	72	96	120	144	168	192	216	240
xi)	200	16	32	48	64	80	96	128	160	192	224	256	288	320
xii)	250	20	40	60	80	100	120	160	200	240	280	320	360	400
xiii)	300	24	48	72	96	120	144	192	240	288	336	384	432	480
xiv)	400	32	64	96	128	160	192	256	320	384	448	512	576	640
xv)	500	40	80	120	160	200	240	320	400	480	560	640	720	800
xvi)	1 000	80	160	240	320	400	480	640	800	960	1 120	1 280	1 440	1 600
xvii)	2 000	160	320	480	640	800	960	1 280	1 600	1 920	2 240	2 560	2 880	3 200
xviii)	3 000	240	480	720	960	1 200	1 440	1 920	2 400	2 880	3 360	3 840	4 320	4 800

Table 2 Water Availability for a Given Roof Top Area and Rainfall (For Sloping Roofs)
(Clause 5.1)

Sl No.	Roof Top Area m ²	Rainfall, mm												
		100	200	300	400	500	600	800	1 000	1 200	1 400	1 600	1 800	2 000
(1)	(2)	Water availability (m ³)												
		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
i)	20	1.9	3.8	5.7	7.6	9.5	11.4	15.2	19	22.8	26.6	30.4	34.2	38
ii)	30	2.9	5.7	8.6	11.4	14.3	17.1	22.8	28.5	34.2	39.9	45.6	51.3	57
iii)	40	3.8	7.6	11.4	15.2	19	22.8	30.4	38	45.6	53.2	60.8	68.4	76
iv)	50	4.8	9.5	14.3	19	23.8	28.5	38	47.5	57	66.5	76	85.5	95
v)	60	5.7	11.4	17.1	22.8	28.5	34.2	45.6	57	68.4	79.8	91.2	102.6	114
vi)	70	6.7	13.3	20.0	26.6	33.3	39.9	53.2	66.5	79.8	93.1	106.4	119.7	133
vii)	80	7.6	15.2	22.8	30.4	38	45.6	60.8	76	91.2	106.4	121.6	136.8	152
viii)	90	8.6	17.1	25.7	34.2	42.8	51.3	68.4	85.5	102.6	119.7	136.8	153.9	171
ix)	100	9.5	19	28.5	38	47.5	57	76	95	114	133	152	171	190
x)	150	14.3	28.5	42.8	57	71.3	85.5	114	142.5	171	199.5	228	256.5	285
xi)	200	19	38	57	76	95	114	152	190	228	266	304	342	380
xii)	250	23.8	47.5	71.3	95	118.8	142.5	190	237.5	285	332.5	380	427.5	475
xiii)	300	28.5	57	85.5	114	142.5	171	228	285	342	399	456	513	570
xiv)	400	38	76	114	152	190	228	304	380	456	532	608	684	760
xv)	500	47.5	95	143	190	237.5	285	380	475	570	665	760	855	950
xvi)	1 000	95	190	285	380	475	570	760	950	1 140	1 330	1 520	1 710	1 900
xvii)	2 000	190	380	570	760	950	1 140	1 520	1 900	2 280	2 660	3 040	3 420	3 800
xviii)	3 000	285	570	855	1 140	1 425	1 710	2 280	2 850	3 420	3 990	4 560	5 130	5 700

correspondingly low and *vice versa*. Conversely, areas where total rainfall occurs during 1-2 months, the water collected during the monsoon has to be stored for use in remaining months throughout the year, which requires large storage structures as well as arrangement for some treatment.

5.3 Intensity of Rainfall

The maximum intensity of rainfall will decide the peak flow, which is to be harvested and depending upon the peak flow, the gutter size for sloping roof and diameter of drainage pipe has to be calculated.

5.4 Collection Surface Area

For roof top rainwater harvesting, the collection area is restricted by the size of the roof of the dwelling unit. Sometimes other surfaces such as terrace, balconies and other projections are used to supplement the roof top collection area.

5.5 Storage Capacity

The storage tank is usually the most expensive component of rainwater harvesting system. Hence a careful analysis is required for design of storage tank capacity.

6 STORAGE OF WATER IN A STORAGE TANK FOR DIRECT USE

6.1 Design of System Components

A roof top catchment system has three main components, namely, a roof, a guttering and first flush device and a storage tank:

- a) *Roof* — In this system, only roof top is the catchment as shown in Fig. 1 and Fig. 2. The roofing should be of galvanized iron sheets (G.I.), aluminium, clay tiles, asbestos or

concrete. In case of thatch-roof, it may be covered with waterproof LDPE sheeting. The roof should be smooth, made of non-toxic material sufficiently large to fill the tank with the available rainfall conditions. Existing roofs of houses and public buildings can be used for a roof top catchment system. In some cases enlarged or additional roofed structures can be built.

- b) *Guttering and First-Flush Device* — Guttering is intended to protect the building by collecting the water running of the roof and direct it, via a downpipe, to the storage tank. Gutter is provided along the edge of the roof. It is fixed with a gentle slope towards downpipe, which is meant for free flow of water to the storage tank. This may be made up of G.I. sheet, wood, bamboo or any other locally available material. The downpipe used should be at least 100 mm diameter and be provided with a 20 mesh wire screen at the inlet to prevent dry leaves and other debris from entering it. The gutter size may be worked out using any standard formula of hydraulics or using Table 3.

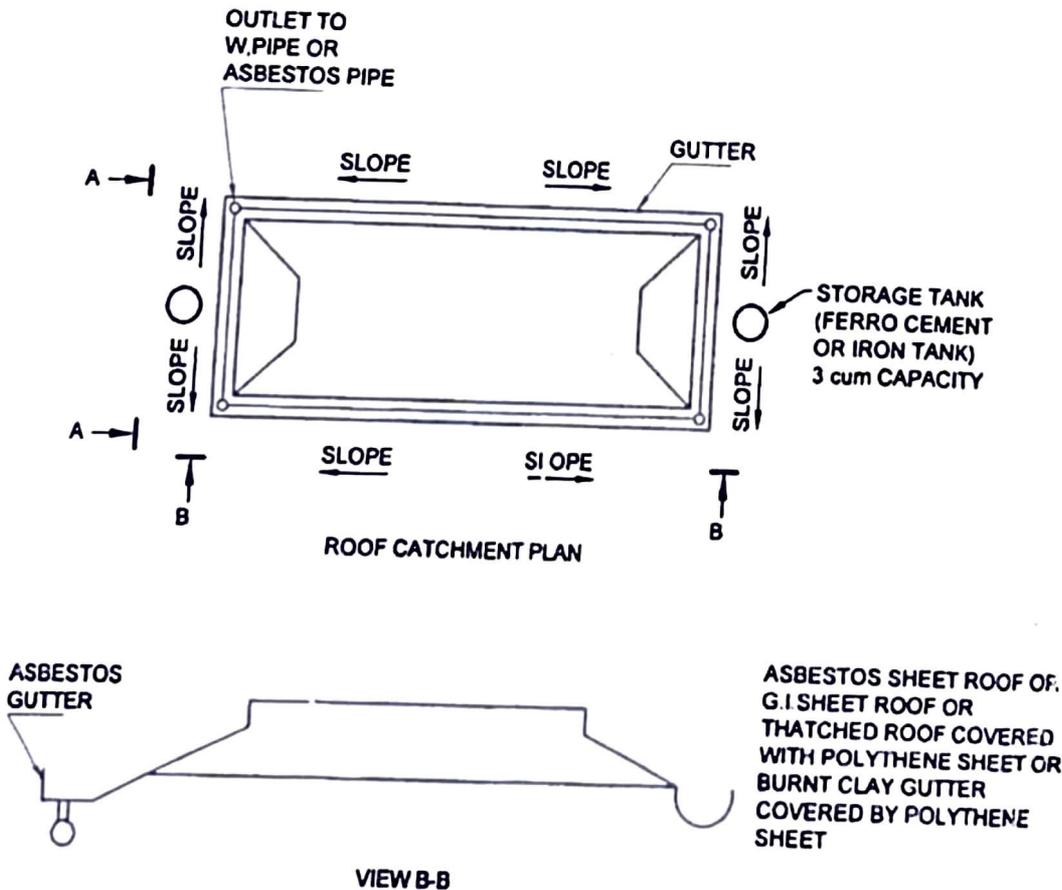
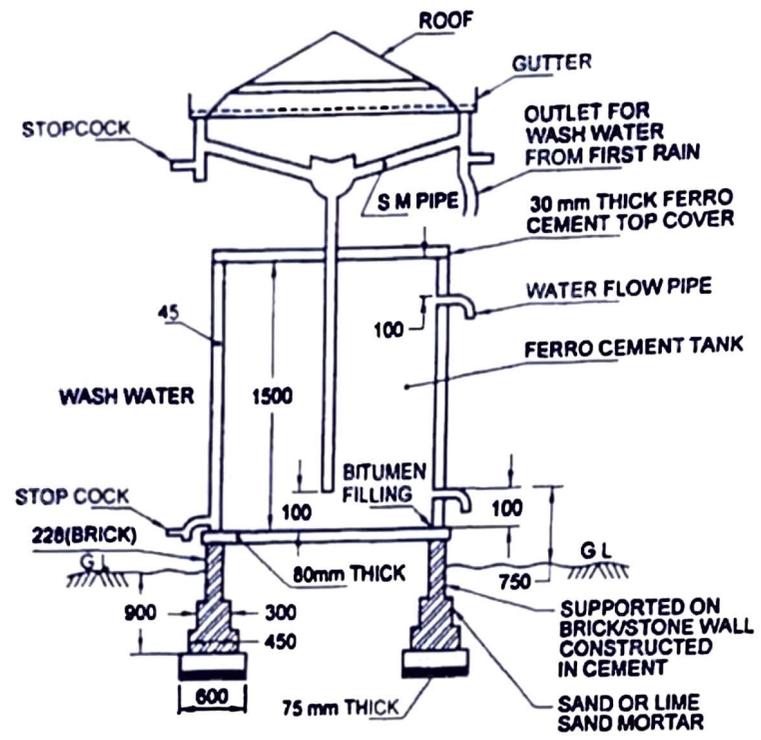
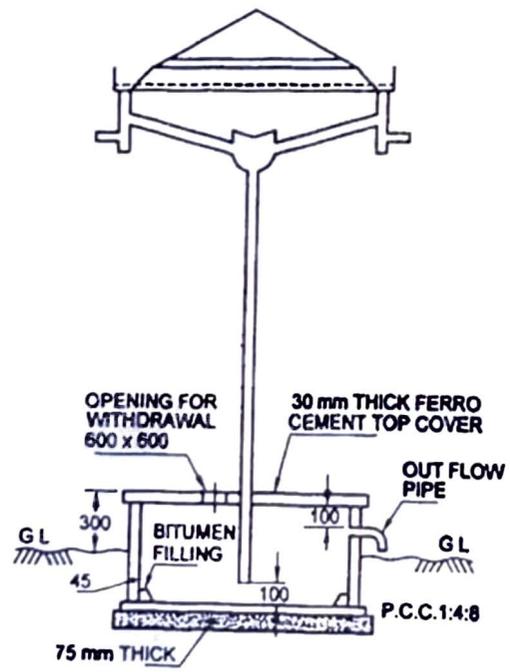


FIG. 1 RAINWATER HARVESTING SYSTEM

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WATER TANK ABOVE GROUND



WATER TANK UNDER GROUND

All dimensions in millimetres.

FIG. 2 RAINWATER HARVESTING STRUCTURES

Table 3 Diameter of Gutter and Width of G.I. Sheet
[Clause 6.1(b)]

Sl No.	Roof Top Area m ²	Rainfall Intensity, mm h														
		Diameter (D) of Channel and Width (W) of G.I. Sheet (mm)														
		10	15	20	25	30	35	40	45	50	60	70	80	90	100	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
i)	10	D	20	23	26	28	30	32	33	35	36	39	41	43	45	47
		W	51	56	60	64	67	70	72	74	77	81	84	88	91	93
ii)	20	D	26	30	33	36	39	41	43	45	47	50	53	56	58	61
		W	60	67	72	77	81	84	88	91	93	99	103	108	112	115
iii)	30	D	30	35	39	42	45	48	50	52	54	58	62	65	68	71
		W	67	74	81	86	91	95	99	102	106	112	117	122	127	131
iv)	40	D	33	39	43	47	50	53	56	58	61	65	69	72	76	79
		W	72	81	88	93	99	103	108	112	115	122	128	134	139	144
v)	50	D	36	42	47	51	54	58	61	63	66	71	75	79	82	86
		W	77	86	93	100	106	111	115	120	124	131	138	144	149	154
vi)	60	D	39	45	50	54	58	62	65	68	71	76	80	84	88	92
		W	81	91	99	106	112	117	122	127	131	139	146	152	158	164
vii)	70	D	41	48	53	58	62	65	69	72	75	80	85	89	93	97
		W	84	95	103	111	117	123	128	133	138	146	153	160	167	172
viii)	80	D	43	50	56	61	65	69	72	76	79	84	89	94	98	102
		W	88	99	108	115	122	128	134	139	144	152	160	167	174	180
ix)	90	D	45	52	58	63	68	72	76	79	82	88	93	98	102	107
		W	91	102	112	120	127	133	139	144	149	158	167	174	181	188
x)	100	D	47	54	61	66	71	75	79	82	86	92	97	102	107	111
		W	93	106	115	124	131	138	144	149	154	164	172	180	188	194
xi)	150	D	54	63	71	77	82	87	92	96	100	107	113	119	124	129
		W	106	120	131	141	149	157	164	170	176	188	197	207	215	223
xii)	200	D	61	71	79	86	92	97	102	107	111	119	126	132	138	144
		W	115	131	144	154	164	172	180	188	194	207	218	228	237	246
xiii)	250	D	66	77	86	93	100	105	111	116	121	129	137	144	150	156
		W	124	141	154	166	176	186	194	202	209	223	235	246	256	266
xiv)	300	D	71	82	92	100	107	113	119	124	129	138	146	154	161	167
		W	131	149	164	176	188	197	207	215	223	237	250	262	273	283
xv)	400	D	79	92	102	111	119	126	132	138	144	154	163	172	179	186
		W	144	164	180	194	207	218	228	237	246	262	276	290	302	313
xvi)	500	D	86	100	111	121	129	137	144	150	156	167	177	186	195	203
		W	154	176	194	209	223	235	246	256	266	283	299	313	326	339
xvii)	1 000	D	111	129	144	156	167	177	186	195	203	217	230	242	253	263
		W	194	223	246	266	283	299	313	326	339	361	381	400	417	433
xviii)	2 000	D	144	167	186	203	217	230	242	253	263	282	298	314	328	341
		W	246	283	313	339	361	381	400	417	433	462	489	513	535	556
	3 000	D	167	195	217	236	253	268	282	294	306	328	347	365	382	397
		W	283	326	361	391	417	441	462	482	501	535	566	594	620	644

NOTES

- 1 Provide minimum diameter of channel of 100 mm and width of sheet 176 mm.
- 2 Diameter to be limited to 300 mm and width of sheet 510 mm

For all tanks having roof catchment, the first runoff of rainwater from the roof should be discarded. This helps keep the water potable because this first flush contains large quantities of dust, leaves and other impurities. This can also be prevented by installation of a gate valve at the end of down pipe at ground level.

c) Tank — Storage tank can be constructed underground or above ground. The

underground tank may be of masonry or R.C.C. structure suitably lined with water proofing materials. The surface tank may be of G.I. Sheet, R.C.C., Plastic/HDP or Ferrocement Tank placed at elevation on a raised platform as shown in Fig. 3. Choice of the tank depends on locally available materials and space available. When the tank is constructed underground, at least 30 cm of the tank should remain above ground. Water

tanks using ferrocement technology come in different designs with volumes ranging between 2 m^3 and 200 m^3 . For example, a free standing cylindrical tank can be built in sizes between 10 m^3 and 30 m^3 , while a capacity of up to 200 m^3 is possible with sub-surface covered tanks. The latter is economical when the capacity exceeds 50 m^3 .

An alternate design, avoiding framework, involves erecting a circular frame made of welded-mesh bars spaced at 15 cm and covered with chicken wire mesh (2.5 cm gauge) onto a reinforced concrete base. This is then covered on the outside with sacks or cloth and two coats of a 1.5 cm layer of mortar (1 part cement, 3 parts sand) and plastered along the inner walls to produce the tank wall. Two further coats of plaster are added, one on the outside after removing the sacks and one on the inside to provide a tank wall thickness of 5 cm. A waterproof coat of cement and water is then added to the tank's inner wall.

When the wall is complete, a wooden frame is constructed inside the tank to support the metal template made from old oil drums, which forms the mould for the domed roof. The roof is also reinforced with welded-mesh and chicken wire. For quality, the floor, walls and the roof need to be cured by moistening their surface for at least a week. This should start immediately after each component is ready.

To facilitate cleaning of the tank, an outlet pipe may be fitted and fixed in the tank at bottom level. The size of the tank will depend upon the factors such as daily demand, duration of dry spell, catchment area and rainfall.

The tank is provided with:

- a) A manhole of $0.60 \text{ m} \times 0.60 \text{ m}$ size with cover,
- b) Vent pipe/overflow pipe of 100 mm diameter, and
- c) Drain pipe of 100 mm diameter at bottom.

The withdrawal of water from the underground tank is

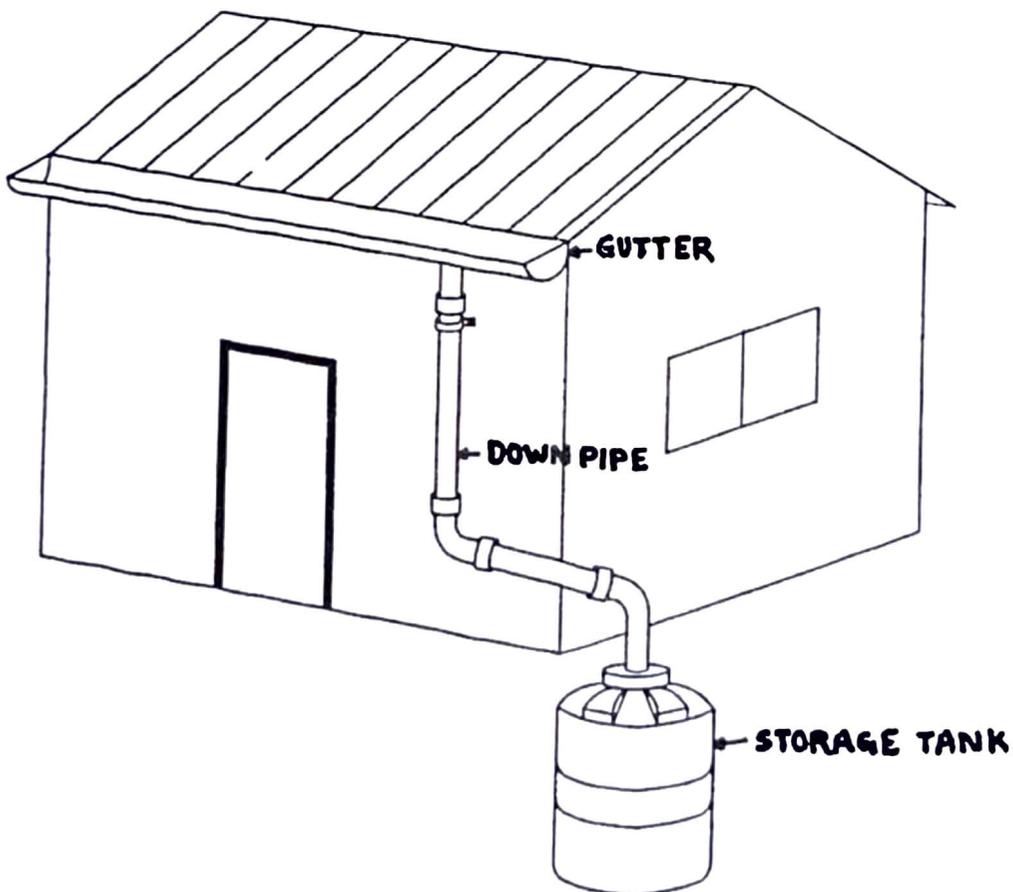


FIG. 3 STORAGE OF RAINWATER IN A HDPE TANK

done by installing a hand pump . In case of surface tank, taps may be provided. The overflow pipe should be connected to a drain/recharge pit.

Before the tank is put into use it should be thoroughly cleaned and disinfected with high dosage of chlorine. Since the water should remain stored for quite a long time, periodical disinfection of stored water is essential to prevent growth of pathogenic bacteria.

6.2 Site Assessment

Assessing the site conditions is the first step towards a sound system design. The five main site conditions to be assessed are:

- Availability of suitable roof catchment,
- Foundation characteristics of soil near the house,
- Location of trees,
- Estimated runoff to be captured per unit area of the roof, and
- Availability and location of construction material.

6.3 Estimating the Size of the Required System

The size of the catchment area and tank should be enough to supply sufficient water for the users during the dry period. Assuming a full tank at the beginning of the dry season (and knowing the average length of the dry season and the average water use), the volume of the tank can be calculated by the following formula:

$$V = t \times n \times q$$

where

- V = volume of tank, in litres;
 t = length of the dry season (days);
 n = number of people using the tank; and
 q = consumption in litres per capita per day.

If, for example, 20 lpd (q) is agreed upon and a dry period of 100 days (t) is normally not exceeded, a storage volume of 10 m³ would be required for a family of 5 members (n).

$$V = 100 (t) \times 5 (n) \times 20 (q) = 10\,000 \text{ litre or } 10 \text{ m}^3$$

The required catchment area (that is the area of the roof) can be determined by dividing the volume of the tank by the accumulated average rainfall volume (in litres) per unit area (in m²) over the preceding wet months and multiplying this with the runoff coefficient, which varies from 0.8 to 0.95 depending upon type of roof.

6.4 General Design Features

Roof top water harvesting systems can provide good

quality potable water, if the design features outlined below are taken into account:

- The substances that go into the making of the roof should be non-toxic and chemically inert.
- Roof surfaces should be smooth, hard and dense since they are easier to clean and are less likely to be damaged and release materials/fibres into the water.
- Roof painting is not advisable since most paints contain toxic substances and may peel off.
- No overhanging trees should be left near the roof.
- Nesting of birds on the roof should be prevented.
- All gutter ends should be fitted with a wire mesh screen to keep out leaves, etc.
- Appropriate arrangement for discarding the first flow of rainfall should be made.
- A hygienic soak away channel should be built at water outlets and a screened overflow pipe should be provided.
- The storage tank should have a tight fitting roof that excludes light, a manhole cover and a flushing pipe at the base of the tank (for standing tanks).
- There should be a reliable sanitary extraction device such as a gravity tap or a hand pump to avoid contamination of the water in the tank.
- There should be no possibility of contaminated wastewater flowing into the tank (especially for tanks installed at ground level).
- Water from other sources, unless it is a reliable source, should not be emptied into the tank through pipe connections or the manhole cover.

6.5 Management and Maintenance

Roof top catchment tanks, like all water supply systems, demand periodic management and maintenance to ensure reliable and quality water supply. If the various components of the system are not regularly cleaned, water use is not properly managed, problems are not identified or necessary repairs not performed, the roof catchment system will cease to provide reliable and good quality water.

Following is a time table of maintenance and management requirements that can provide a basis for monitoring and checking:

- During the rainy season, the whole system (roof catchment, gutters, pipes, screens, first-

flush and overflow) should be checked before and after each rain and preferably cleaned after every dry period exceeding a month.

- b) At the end of the dry season and just before the first shower of rain is anticipated, the storage tank should be scrubbed and flushed of all sediment and debris (the tank should be refilled afterwards with a few centimeters of clean water to prevent cracking). Ensure timely service (before the first rains are due) of all tank fixtures, including replacement of all worn screens and servicing of the outlet tap or hand pump.

6.6 Water Use Management

Control over the quantity of water abstracted from the tank is important to optimize water use. Water use should be managed so that the supply is sufficient to last through the dry season. Failure to do so will mean exhausting all the stored water. On the other hand, underutilization of the water source due to severe rationing should also be avoided.

7 RECHARGE OF HARVESTED RAINWATER IN AQUIFERS

7.0 The runoff water collected from roof tops can artificially recharge and augment the depleting ground water resources especially in the urban areas, where the natural recharge has diminished considerably. The areas having depth to water table greater than 8 m below ground level and underlain by permeable strata are suitable for artificial recharge.

7.1 Design of Efficient Artificial Recharge Structures

The design involves consideration of data on hydrological and hydrogeological aspects and hydrometeorological parameters. The background information to be collected is as given below:

- a) Layout plan of the area.
- b) Demarcation of the roof, paved and open areas.
- c) Delineation of storm water drains and flow of storm water.
- d) Details of the existing ground water abstraction structures in and around the vicinity of the project site.
- e) Computation of the runoff for recharge.

Apart from the above mentioned parameters, selection of appropriate recharge structure depends on the availability of space for construction of recharge structures and invert levels of storm water drains at inlets to recharge structures. While preparing the

recharge scheme, depth and shape of the storage facility in recharge structure depends on the availability of runoff, depth of storm water drainage and space availability in an area. The recharge scheme as prepared may also be got vetted by appropriate authorities and experts to incorporate suggestions for improvement.

7.2 Recharge Structures

The most suitable recharge structures for roof top rain water harvesting are:

- a) Recharge pits;
- b) Recharge trenches;
- c) Recharge through dry or operational dugwells;
- d) Recharge through abandoned/existing tube wells; and
- e) Recharge wells, etc.

7.2.1 Recharge Pits

- a) In alluvial areas where permeable rocks are exposed on the land surface or at very shallow depth, recharge pits are suitable for artificial recharge of water collected from the roof tops.
- b) The technique is suitable for buildings having a roof area of 100 m². The recharge pits are constructed for recharging the shallow aquifers.
- c) Recharge pits may be of any shape and size and are generally constructed 1 to 2 m wide and 2 to 3 m deep which are backfilled with boulders (5-20 cm), gravels (5-10 mm), and coarse sand (1.5-2 mm) in graded form — boulders at the bottom, gravels in between and coarse sand at the top so that the silt content that will come with runoff will be deposited on the top of the coarse sand layer and can easily be removed. For smaller roof area, pit may be filled with broken bricks/cobbles.
- d) A mesh should be provided at the roof so that leaves or any other solid waste/debris are prevented from entering the pit and a desilting/collection chamber may also be provided at the ground to arrest the flow of finer particles to the recharge pit.
- e) The top layer of sand should be cleaned periodically to maintain the recharge rate.

7.2.2 Recharge Trenches

- a) Recharge trenches are suitable for buildings having roof area of 200-300 m² and where permeable strata is available at shallow depths.
- b) Trench may be 0.5 to 1 m wide, 1 to 1.5 m

deep and 10 to 20 m long depending upon availability of water to be recharged.

- c) These are backfilled with boulders (5-20 cm), gravels (5-10 mm), and coarse sand (1.5-2 mm) in graded form — boulders at the bottom, gravel in between and coarse sand at the top so that the silt content that will come with runoff will be deposited on the top of the sand layer and can easily be removed.
- d) A mesh should be provided at the roof so that leaves or any other solid waste/debris is prevented from entering the trench and a desilting/collection chamber may also be provided on ground to arrest the flow of finer particles to the trench.
- e) The top layer of sand should be cleaned periodically to maintain the recharge rate.

7.2.3 Recharge Through Dry or Operational Dug Wells (see Fig. 4)

- a) Dry/operational dug wells if exist in the area may be utilized as recharge structures after cleaning and desilting the same.
- b) Recharge water is guided through a pipe from desilting chamber to the bottom of the well or below the water level to avoid scouring of bottom and entrapment of air bubbles in the aquifer.

- c) Recharge water should be silt-free. For removing the silt content, the runoff water should pass either through a desilting chamber or filter chamber.
- d) Periodic chlorination should be done for controlling the bacteriological contamination in operational dug well.
- e) Wire mesh filter should be provided just before the inlet to avoid entry of any foreign material, tree leaves, etc, in to the dug well.

7.2.4 Recharge Through Abandoned/Existing Tube Wells (see Fig. 5 and Fig. 6)

- a) Abandoned/existing tube wells may be used as recharge structures.
- b) The abandoned tube well should be properly developed before use as recharge structure.
- c) PVC pipes of 10 cm diameter are connected to roof drains to collect rainwater.
- d) The first roof runoff is drained through the bottom of drain pipe if existing tube well is used as recharge structure. After closing the bottom pipe, the rainwater of subsequent rain showers is taken through a 'Tee' to an online PVC filter in case of small roofs. If the roof area is larger, a filter pit may be provided. Rainwater from roofs is taken to collection/

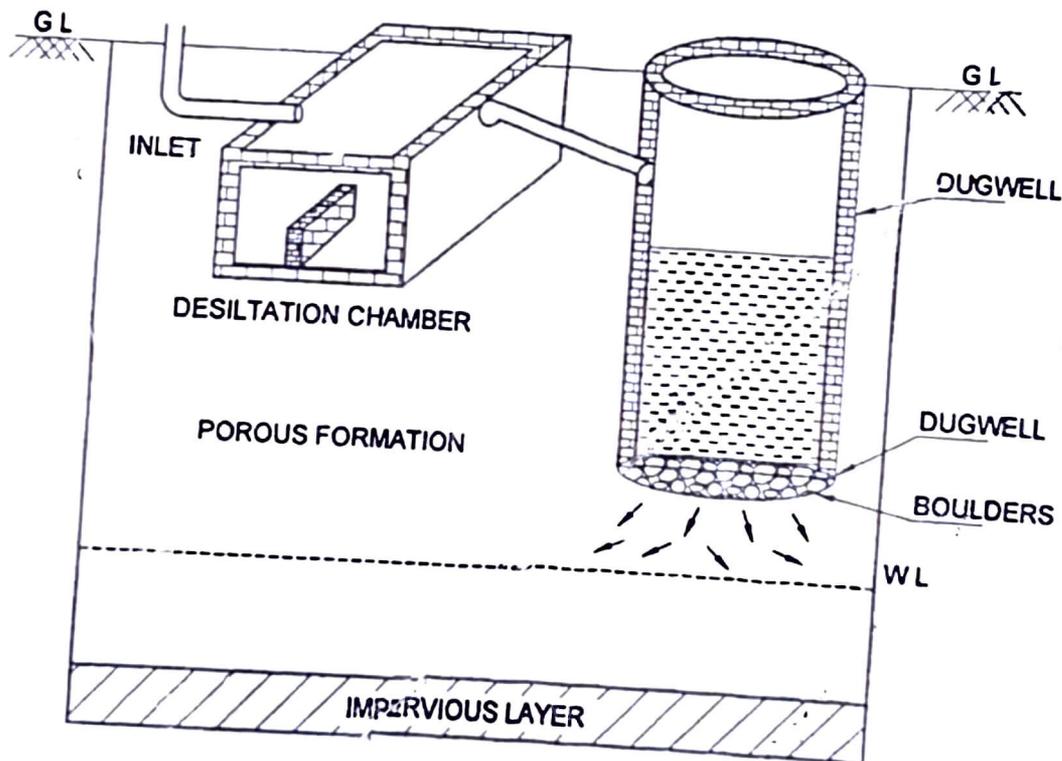


FIG. 4 RECHARGE THROUGH DUG WELL

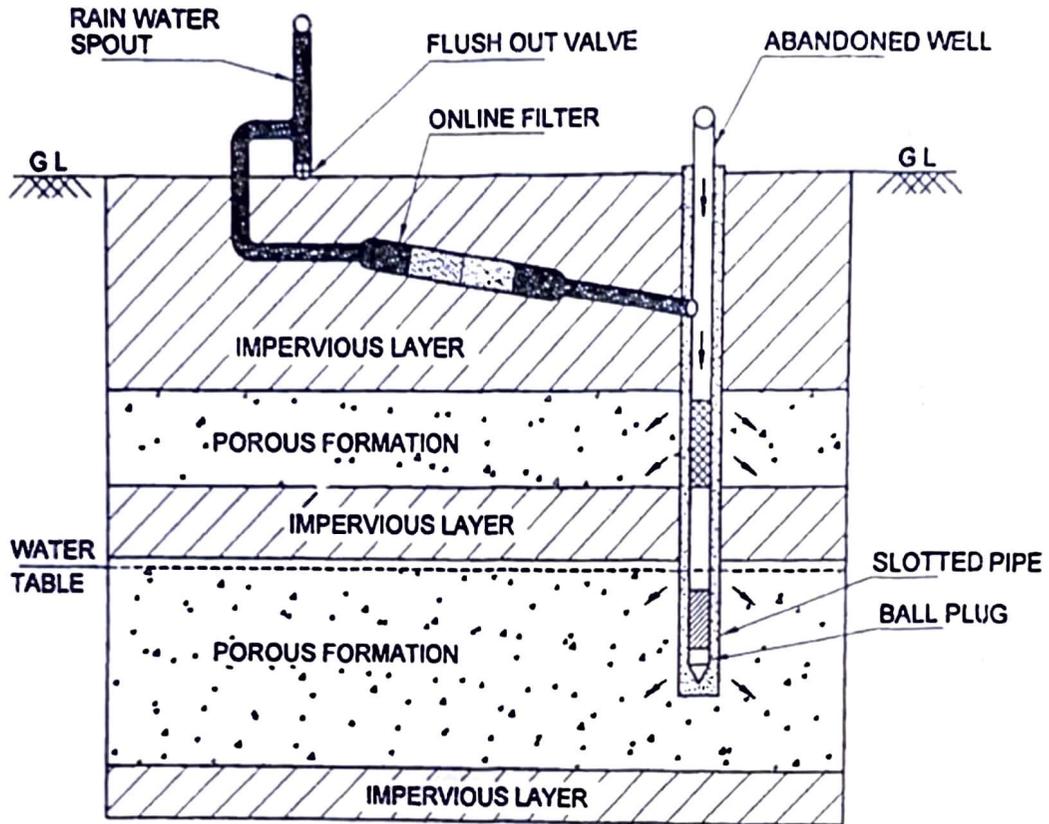
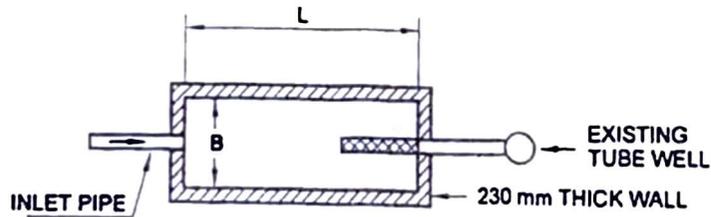
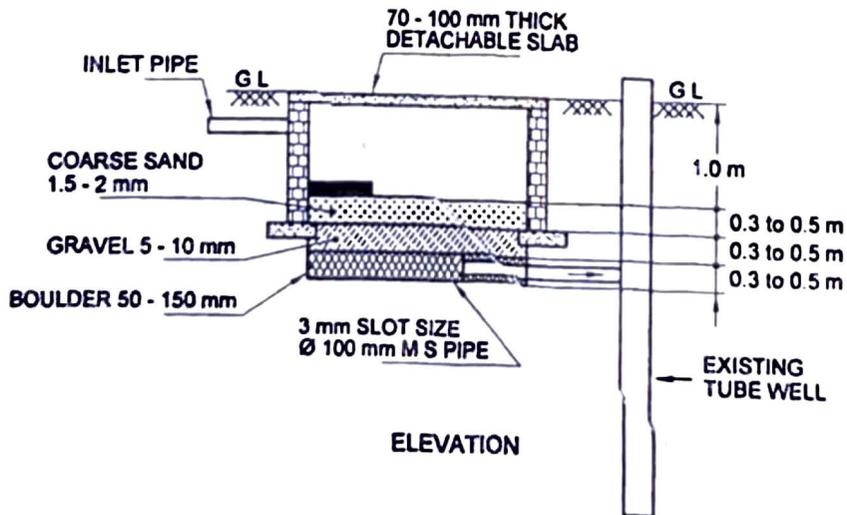


FIG. 5 RECHARGE THROUGH ABANDONED TUBE WELL



PLAN



ELEVATION

FIG. 6 RECHARGE THROUGH EXISTING TUBE WELL

desilting chambers located on ground. These collection chambers are interconnected as well as connected to the filter pit through pipes.

- e) A connecting pipe with recharge well is provided at the bottom of the pit for recharging of filtered water through well.
- f) Wire mesh filter should be provided just before the inlet to avoid entry of any foreign material, tree leaves, etc., in to the system.

7.2.5 Recharge Wells (see Fig. 7)

- a) In areas where the aquifers are overlain by a considerable thickness of impervious formation, a new recharge tube well can be constructed for recharging the harvested rainwater.
- b) It is used for recharging single/multiple aquifers.
- c) A settlement-cum-storage tank is constructed near the tube well for settlement of silt particles and storage of excess water.
- d) Roof top water is diverted to the settlement tank through pipes.

- e) Clear water of storage tank is diverted to the recharge tube well for recharge.
- f) It is suitable for recharging roof top rainwater of big buildings/blocks.
- g) If runoff availability is less, then online filter may be used in the pipe line connecting roof water with recharge well.

7.2.5.1 Construction of recharge well

These are drilled by deploying the appropriate rig unit or by hand boring as per the site conditions and depth of the tube wells.

A well assembly of pipes with diameters varying from 100 to 250 mm may be lowered throughout the depth. Both M.S. and PVC pipes can be used. PVC pipes are rigid, light pipes in 6 or 9 m lengths available in all diameters. The main advantage of PVC pipes is their resistance to corrosion and slots of the pipes will not close with time. As the slotted pipes in recharge wells are in fluctuation zones of water levels, slots of M.S. pipes may become closed due to rusting. The main drawback of PVC pipes is that, these pipes can not be used in large diameter recharge wells. M.S. Pipes may be coated with bituminous coating to avoid rusting.

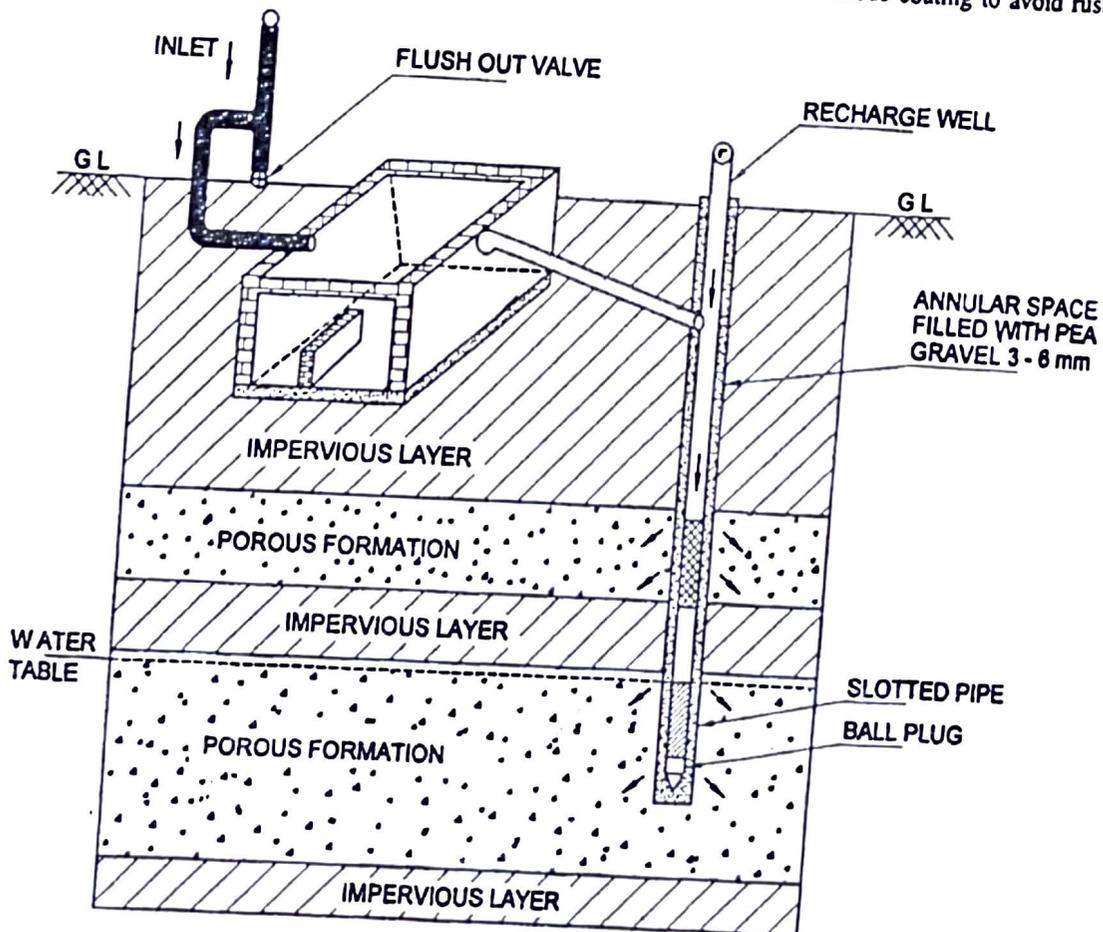


FIG. 7 RECHARGE THROUGH BORE WELL

IS 15797 : 2008

After excavation of the recharge trench/shaft or filtration chamber is over, pipes should be rechecked and cleaned with wire brush. Depth sounding of recharge wells should be taken with tape to make sure that no silt or soil has gone into the recharge wells during the excavation of trench/shaft. Width of slots in recharge well should be in accordance with the aquifer system encountered. Slotted pipes should be placed against the aquifer or dried-up aquifers encountered in the recharge wells. A slotted pipe at the top of the recharge well will need to be placed to permit the entry of clean/clear water into the recharge well.

The annular space around the well assembly may be shrouded with appropriate size of gravel. The gravel should be washed so that it is silt-free. The recharge tube well should be developed by low capacity air compressor or by bailing method as required. The well may also be cleaned and developed by pouring the water from outside if required. The water levels of the tube well should be recorded and the well covered with cap with a provision to monitor the well in future. A vent pipe of about one inch diameter is also recommended which can act as escape for gases and for measuring the water levels. Once the recharge trench or shaft is constructed around the recharge tube well, recharge wells may be developed with hand bailers to avoid the disturbance of filter media.

7.2.5.2 Recharge ability test

To test the recharge ability of the tube well, a slug test may be conducted [see IS 14476 (Part 6)].

7.3 Filters

Generally, the following two types of filters are used :

a) *Online Filter*

- 1) This filter is used when availability of runoff as well as recharge rate of recharge well is less.
- 2) Manufactured from reinforced engineering plastic material.
- 3) Available in various sizes and flow rates ranging from 3 to 25 m³/h.
- 4) Easy to open and clean.

b) *Purpose Built Filter*

- 1) The filter material recommended is coarse sand of 1.5 to 2 mm size at the top, followed by gravel of 5 to 10 mm size, and boulders of 5 to 20 cm at bottom. The thickness of each layer should be about 0.5 m. Coarse sand should be placed at the top so that the silt content that comes with runoff will be deposited on the top of the coarse sand/

pea gravel and can easily be removed. For smaller roof area the pit may be filled with overburnt broken bricks/cobbles.

- 2) After excavation of filter chamber, boulders and gravel should be filled up first to the foundation of wall of the structure.
- 3) After filling of boulder and gravel, filter material should be covered with polythene/jute bags to avoid spilling of construction material, which may damage the filter bed. After the construction of walls, the polythene/jute bags should be removed and the sand/pea gravels filled up to the recommended depth as per the design.
- 4) Filter media should be free from silt and any other foreign material. Before putting the filter material into the chamber, filter material should be sieved and washed to remove all the finer material. During operation the scouring effect of flow of water into the structure should be checked upon and if flow is disturbing the filter media, the water can be released near the filter media. This can be done by providing an 'I' shape joint in the inlet pipe in trench.
- 5) Regular inspection of filter material is essential in recharge structures. Silt deposited on the filter media should be cleaned regularly. Once in a year the top 5-10 cm sand/pea gravel layer should also be scraped to maintain a constant recharge rate through filter material.
- 6) Growth of grass or bushes hampers the filtration rate of the chamber. The grass and bushes should be cleared regularly.

7.4 Maintenance of Catchment Area, Water Drains and Recharge Structures

- a) The catchments should be neat and clean. The roof top/terrace of the building spaces around the buildings should not be used for dumping of unwanted items and scrap material.
- b) The washing machine water having heavy dose of detergents should not be allowed to enter into the water drains which are connected with recharge structures.
- c) Open water drains covered with perforated detachable RCC slabs are best as the maintenance of these drains is easy and pollution, especially bacteriological pollution, can be avoided. If the storm water drainage is through pipe system, provide manholes and

- chambers at regular intervals as well as close to the suspected silt and waste accumulation places within the channel.
- d) Protect the drainage system from tree leaves, polythene bags, plastic bottles and pouches of eatables.
- e) Put up sign boards mentioning that the campus of building is equipped with rainwater harvesting system which is being recharged to the ground water system. Mention the ill effects and health impacts if the storm water drains are not properly maintained. Educate the staff maintaining the storm water drains to keep the drains neat and clean.
- f) Provide wire mesh filter just before the inlet. Provide silt check wall within the drain bed at a convenient place. If more silt is expected provide check wall at regular intervals in the storm water drains.
- g) The periodic removal of the material deposited on the surface be done by scraping the silt accumulated on top of the filter bed regularly.
- h) Precaution should be taken to avoid domestic waste water entering into the recharge structures.
- j) Recharge tube wells should be developed periodically by hand bailers to avoid clogging of the slots.
- k) Before the arrival of monsoon, the roof top as well as drains should be properly cleaned.
- m) Length and placement of the slotted pipe should be finalized after drilling of pilot hole for tube well.
- n) Recharge water should be introduced into the structure at its lowest point to prevent erosion and disturbance of filter material.
- p) A wire mesh should be placed at the entrance of recharge structures.
- q) Periodic cleaning of collection chambers should be carried out to remove the plastic bags, leaves, etc, which may choke the entry of water recharge structures.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Ground Water and Related Investigations Sectional Committee, WRD 3

Organization

Central Ground Water Board, New Delhi
 Central Electricity Authority, Hyderabad
 Central Ground Water Board, Faridabad
 Central Pollution Control Board, New Delhi
 Central Soil and Salinity Research Institute, Karnal
 Central Water & Power Research Station, Pune
 Central Water Commission, Faridabad
 Centre for Water Resources Development & Management, Kozhikode
 Geological Survey of India, Lucknow
 Ground Water Surveys and Development Agency, Pune

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Ms BHAVANA SHARMA
Assistant Director (WRD), BIS

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Amendments Issued Since Publication

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Ministry of Environment, Forest and Climate Change
Regional Office (Central Region)



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पत्र सं० 8वीं/यू.पी./06/01/2018/एफ.सी. 1865

दिनांक: 09-3-18

सका मे,

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उत्तर प्रदेश शासन, छठवा तल,
बापू भवन, लखनऊ

ऑनलाईन प्रस्ताव संख्या-FP/UP/ROAD/28804/2017

विषय: लखनऊ से बलिया (बाया आजमगढ़) पूर्वांचल एक्सप्रेसवे के निर्माण में लखनऊ, बाराबंकी, सुल्तानपुर, आजमगढ़, मऊ एवं गाजीपुर वन प्रभाग में प्रभावित 9.1549 हे० आरक्षित वन भूमि एवं 8.4165 हे० संरक्षित वनभूमि अर्थात् कुल 17.5714 हे० वनभूमि के गैर वानिकी प्रयोग एवं बाधक कुल 5439 वृक्षों/पौधों के पातन की अनुमति के संबंध में।

सन्दर्भ:- मुख्य वन संरक्षक एवं नोडल अधिकारी, उ० प्र० का पत्रांक- /11सी-FP/UP/ROAD/28804/2017. दिनांक-07 03.2018

महोदय,

कृपया उपरोक्त विषय पर विशेष सचिव, उत्तर प्रदेश शासन का पत्रांक- 3063/14-2-2017-800(143)/2017 दिनांक- 03.01.2018 का आशय ग्रहण करने का कष्ट करें, जिसके द्वारा विषयांकित प्रस्ताव में वन संरक्षण अधिनियम 1980 की धारा (2) के अन्तर्गत भारत सरकार की स्वीकृति माँगी थी।

प्रकरण को दिनांक- 27.02.2018 को आहूत की गयी क्षेत्रीय सशक्त समिति (REC) की बैठक में (REC Agenda item 25.1-UP) शामिल किया गया था जिसमें विचारोपरान्त प्रकरण को सशर्त स्वीकृति प्रदान की गयी है जिसकी अनुपालन आख्या मुख्य वन संरक्षक एवं नोडल अधिकारी, उ० प्र० के उपरोक्त संदर्भित पत्र द्वारा प्रस्तुत की गयी है। प्रस्तुत अनुपालन पर विचारोपरान्त मुझे आपको सूचित करने का निर्देश हुआ है कि केन्द्र सरकार लखनऊ से बलिया (बाया आजमगढ़) पूर्वांचल एक्सप्रेसवे के निर्माण में लखनऊ, बाराबंकी, सुल्तानपुर, आजमगढ़, मऊ एवं गाजीपुर वन प्रभाग में प्रभावित 9.1549 हे० आरक्षित वन भूमि एवं 8.4165 हे० संरक्षित वनभूमि अर्थात् कुल 17.5714 हे० वनभूमि के गैर वानिकी प्रयोग एवं बाधक कुल 5439 वृक्षों/पौधों के पातन की सैद्धान्तिक स्वीकृति निम्नलिखित शर्तों पर प्रदान करती है:-

1. प्रयोक्ता अभिकरण द्वारा वन विभाग के पक्ष में प्रभावित वन क्षेत्र के समतुल्य गैर वनभूमि अर्थात् 17.8325 हे० पर क्षतिपूरक वृक्षारोपण एवं 10 वर्षों तक रखरखाव हेतु आवश्यक धनराशि (प्रचलित दरों को समाहित करत हुए यथासंशोधित) कैम्पा, नई दिल्ली में जमा की जाएगी।

उक्त भूमि वन विभाग के स्वामित्व के बाहर की है। इसे वन विभाग के पक्ष में हस्तान्तरण एवं नामान्तरण किया जायेगा तथा इस भूमि को छः माह में आरक्षित/संरक्षित वन भूमि घोषित किया जायेगा। भूमि का हस्तान्तरण एवं नामान्तरण करने के पश्चात् इस कार्यालय द्वारा विधिवत् स्वीकृति प्रदान की जायेगी।

2. (क) प्रयोक्ता अभिकरण द्वारा माननीय उच्चतम न्यायालय के रिट पिटीशन (सिविल) 202 / 1995 के अन्तर्गत आई०पी० संख्या 566 एवं भारत सरकार के पत्र संख्या 5-3/2007-एफ०सी० दिनांक 05.02.2009 के तहत में दिश में आदेशानुसार शुद्ध वर्तमान मूल्य (एनपीवी) की निर्धारित राशि कैम्पा, नई दिल्ली में जमा की जायेगी।

(ख) इसके उपरान्त जमा की गयी धनराशि की ऑनलाईन ई-रसीद की छायाप्रति सहित सैद्धान्तिक स्वीकृति की अनुपालन आख्या (जिसमें जमा की गयी धनराशि का मदवार विवरण अर्थात् क्षतिपूरक वृक्षारोपण एन०पी०वी० हेतु जमा धनराशि का विवरण दिया गया हो) प्रेषित की जाए, तदोपरान्त ही विधिवत् स्वीकृति पर विचार किया जाएगा।

(ग) प्रयोक्ता अभिकरण इस आशय का वचनबद्धता प्रमाण पत्र (सक्षम स्तर द्वारा) प्रस्तुत करेगा कि यदि प्रस्ताव की दर में कतलेशे आवी है या बढ़ी हुई धनराशि प्रयोक्ता अभिकरण द्वारा जमा की जाएगी।

3. विधिवत् स्वीकृति जारी होने के बाद प्रस्तावित वन क्षेत्र का सीमा स्तम्भों द्वारा सीमांकन प्रयोक्ता अभिकरण के व्यय पर किया जायेगा। अक्षांश एवं देशान्तर भी मानचित्र एवं पीलर पर दर्शाया जायेगा और वन क्षेत्र में लगे प्रत्येक स्तम्भ के आगे (forward) एवं पीछे (backward) उनकी दिशा (bearing) भी लिखनी होगी।
4. प्रयोक्ता अभिकरण इस आशय का वचनबद्धता पत्र प्रस्तुत करेंगे कि आई0आर0सी0 के मानकों के अनुरूप तथा माननीय राष्ट्रीय हरित अधिकरण (NGT) सेंट्रल जोन बेंच, भोपाल द्वारा प्रार्थना पत्र संख्या-27/2015 बाबूलाल जाजू बनाम राजस्थान सरकार में दिनांक-16.11.2015 में दिये गये आदेश की अनुपालना में प्रयोक्ता अभिकरण द्वारा स्वयं के व्यय पर वन विभाग के दिशा निर्देशन में सड़क के दोनों तरफ तथा Median पर (यदि उपलब्ध है तो) वृक्षारोपण किया जाएगा।
5. प्रयोक्ता अभिकरण द्वारा मक डिस्पोजल योजना प्रभागीय वनाधिकारी द्वारा स्वीकृत कराकर इस कार्यालय को प्रेषित की जायेगी।
6. प्रयोक्ता अभिकरण एवं राज्य सरकार वर्तमान तथा भविष्य में लागू सभी नियम, कानून तथा दिशा निर्देशों का पालन करेगी।
7. सैद्धान्तिक स्वीकृति की अनुपालना प्रेषित करते हुए संबंधित प्रभागीय वनाधिकारी प्रकरण में वन संरक्षण अधिनियम 1980 के उल्लंघन के विषय में सूचना/प्रमाण पत्र प्रस्तुत करेंगे।
8. पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, नई दिल्ली के पत्र- 11-306/2014-एफ0सी0(प1.), दिनांक- 28.08.2015 द्वारा जारी दिशा निर्देशानुसार सैद्धान्तिक स्वीकृति जारी होने के उपरान्त सैद्धान्तिक स्वीकृति में उल्लिखित शर्तों के अनुपालनार्थ अर्थात् क्षतिपूरक वृक्षारोपण, एन0पी0वी, वन्यजीव संरक्षण योजना, बौने औषधीय पौधों के वृक्षारोपण हेतु एवं अन्य मद् में जमा होने वाली धनराशि कैम्पा में जमा किये जाने के उपरान्त एवं गैर वन भूमि प्रत्यावर्तन के मामलों में गैर वन भूमि का वन विभाग के पक्ष में हस्तान्तरण एवं नामान्तरण के उपरान्त प्रयोक्ता अभिकरण द्वारा प्रकरण-में प्रस्तावित वृक्षों का पातन एवं कार्य आरम्भ किया जा सकता है।

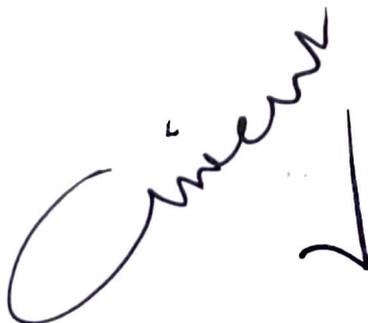
उपरोक्त सभी शर्तों के परिपूर्ण एवं बिन्दुवार सुस्पष्ट परिपालन आख्या इस कार्यालय के पत्र-II/FC/ROC/95-2011/Part-V/1227 दिनांक- 02फरवरी, 2016 के अनुसार प्राप्त होने पर ही वन (संरक्षण) अधिनियम, 1980 के तहत विधिवत स्वीकृति जारी की जायेगी।

भवदीय,

(बृजेन्द्र स्वरूप)
वन संरक्षक (केन्द्रीय)

प्रतिलिपि सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित:

1. अतिरिक्त वनमहानिदेशक एफ.सी., पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, इन्दिरा पर्यावरण भवन, जोरबाग रोड, नयी दिल्ली-110003.
2. निदेशक (आर0ओ0एच0क्यू0) पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, इन्दिरा पर्यावरण भवन, जोरबाग रोड, नयी दिल्ली-110003.
3. नोडल अधिकारी एवं मुख्य वन संरक्षक, (वन संरक्षण), वन विभाग, 17 राणा प्रताप मार्ग, लखनऊ।
4. प्रभागीय वनाधिकारी, लखनऊ, वाराणसी, आजमगढ़, सुल्तानपुर, मऊ एवं वाराणसी, उ0 प्र0।
5. उप मुख्य कार्यपालक अधिकारी (यूपीडा) उ0 प्र0 एक्सप्रेसवेज औद्योगिक विकास प्राधिकरण, विपिन सण्ड, गोमती नगर, लखनऊ।
6. वैयक्तिक सहायक, पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, क्षेत्रीय कार्यालय, लखनऊ को वेबसाइट पर अपलोडिंग हेतु प्रेषित।
7. आदेश प्रभावली




(बृजेन्द्र स्वरूप)
वन संरक्षक (केन्द्रीय)

Directorate of Environment, U.P.
 Viceet Khand-1, Gomti Nagar, Lucknow - 226 010
 Phone : 91-522-2300 541, Fax : 91-522-2300 543
 E-mail : docxpko@yahoo.com
 Website : www.seiaaup.in

Uploaded on
www.seiaaup.in

To,
Shri Vishwa Deepak,
Chief Executive Officer,
M/s U.P. Expressways Industrial Development Authority,
C-13, 2nd Floor, Paryatan bhawan,
Vipin Khnad, Gomti Nagar,
Lucknow-226010

Ref. No. 380...../Parya/SEAC/3696/2016

Date: 22/03, 2017

Sub: Environmental Clearance for development of Samajwadi Purvanchal Expressway (Green Field) in the State of Uttar Pradesh (from Chand Sarai District Lucknow (Km (-) 0+456) to Haldariya District Ghazipur (Km 341+010) with Varanasi Link (Km 0+000 to Km 12+450), M/s U.P. Expressways Industrial Development Authority, Regarding,

Dear Sir,

Please refer to your application/letters 07-06-2016, 24-11-2016, 08-12-2016 & 23-12-2016 addressed to the Secretary, State Level Expert Appraisal Committee (SEAC) and Director, Directorate of Environment Govt. of UP on the subject as above. A presentation was made by the representative of the project proponent along with their consultant M/s CEMC Pvt. Ltd in the SEAC meeting dated 24/12/2016.

The Project proponent, through documents (submitted to SEAC) and presentation made during meeting, has informed to the SEAC that:-

1. The environmental clearance is sought for development of Samajwadi Purvanchal Expressway (Green Field) in the State of Uttar Pradesh (from Chand Sarai District Lucknow (Km (-) 0+456) to Haldariya District Ghazipur (Km 341+010) with Varanasi Link (Km 0+000 to Km 12+450), M/s U.P. Expressways Industrial Development Authority.

2. Project description:

Features	Description as per the Approved TOR /Final Submitted EIA report	Revised Values due to detailed Survey which is not included in EIA report
Location	Chand Sarai, District Lucknow to Kabirpur, District Ghazipur	Chand Sarai, District Lucknow to Haldariya, District Ghazipur
Project Type	6-Lane Expressway from District Lucknow to Kabirpur, District Ghazipur for a length of Km 340.500 (Green Field)	Chand Sarai, District Lucknow to Haldariya, District Ghazipur for a length of Km 341.010 (Green Field) with 4 Lane Varanasi Link for a length of 12.450 km (Green Field)
District	09 District of Uttar Pradesh (Lucknow, Barabanki, Amethi, Sultanpur, Ambedkar Nagar, Faizabad, Azamgarh, Mau and	Same.

Forest Land Involved (in ha)	Ghazipur) Approx. 35 ha.	Same
Total Length of the road	352.494 Km	353.460 km
ROW	120	Same
No. of major Bridges	07	08
No. of minor Bridges	110	117
No. of Box Culverts	508	485
No. of Flyover	14	18
No. of ROB	7	8
No. of LVU	115	126
No. of VUP	36	41
No. of PUP	29	49
Area/ Land Involved	4250 Ha	4982.285 Ha
Total Cost of Project	INR 12070 crores (Civil Cost only)	INR 22317.77 crores (Civil Cost +L.A)
Total water requirement for construction and others	16835262 KL	36705570 KL
Lane width	3.75m (3x3.75=11.25m C/w	Same
Design speed maximum	120 kmph	Same
Major River Crossed	Gomti, Majhue, Tons, Bhaisahl	Same
Canal crossed	Sharda canals and other irrigation cannals	Same
Toll Plaza	2 Main Toll Plaza, 6 Mini Toll Plaza and 4 Toll booth.	Same
Rest Area	08	Same
Pavement Type	Flexible pavements and rigid pavement at toll plazas	Same

3. Water requirement details:

S. N.	Purpose	Total Water Requirement (KL)
1	Construction Work (Embankment, Subgrade, GSB, WMM, Stone Pitching & Filter Media)	29907177
2	Curing for structures & Sprinkling for dust suppression	6488128
3	Grass Turfing	274265
4	Domestic Chores	22500
5	Drinking	4500
6	Maintain Hygiene in Labour Camps	4500
7	Others	4500
	Total	36705570

4. Approx. 36705570 KL water will be required from underground and surface water sources (including borewells, rivers and canals) & will be used to meet water requirement during construction phase of the proposed project road.

5. District wise water consumption details:

SL.NO.	PACKAGE/DISTRICT	WISE	WATER	FROM	TO	WATER
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	REQUIREMENT			CONSUMPTION in KL
01	Package-I: From Chand Sarai (Dist. Lucknow) to Sansara (Dist. Barabanki)	Km (-) 0+456	Km 40+200	4221982 KL
02	Package-II: From Sansara (Dist. Barabanki) to Jaraikala (Dist. Amethi)	Km 40+200	Km 79+900	4122704 KL
03	Package-III: From Jaraikala (Dist. Amethi) to Sidhi Ganeshpur (Dist. Sultanpur)	Km 79+900	Km 121+600	4330397 KL
04	Package-IV: From Sidhi Ganeshpur (Dist. Sultanpur) to Sansarpur (Dist. Sultanpur)	Km 121+600	Km 164+300	4434244 KL
05	Package-V: From Sansarpur (Dist. Sultanpur) to Gobindpur (Dist. Azamgarh)	Km 164+300	Km 218+300	5607709 KL
06	Package-VI: From Gobindpur (Dist. Azamgarh) to Mojrapur (Dist. Azamgarh) Varanasi Link : From Madhesiya to Kotila (Dist. Azamgarh)	Km 218+300 Km 0+000	Km 246+500 Km 12+450	4226966 KL
07	Package-VII: From Mojrapur (Dist. Azamgarh) to Bijaura (Dist. Ghazipur)	Km 246+500	Km 292+530	4780053 KL
08	Package-VIII: From Bijaura (Dist. Ghazipur) to Haidariya (Dist. Ghazipur)	Km 292+530	Km 340+500	4981515 KL

6. 159701 MT of Bitumen shall be used in the project and will be taken from Mathura Refinery of IOCL.
7. A total of 365745 trees for avenue plantation and 276105 shrubs on Median shall be planted. The plantation shall be carried out as per IRC SP 21: 2009 guidelines on the available land within proposed ROW.
8. There is no rare, threatened & endangered species of flora and fauna found along the project road.
9. There are four thermal power stations of NTPC located at Unchahar, Tanda, Panki and Vindhychal within 100-120 km (aerial distance) of the project corridor. The fly ash so generated shall be utilized in the construction of embankment of the proposed project.
10. An effective surface and subsurface drainage system of pavement structures has been designed as stipulated in IRC: 42 as per site conditions.
11. Construction material waste would be disposed off in a manner not to block the flow of water.
12. Roadside drains will be cleaned regularly, especially before the monsoon season.
13. Rainwater harvesting structures are proposed all along the proposed alignment as per MoEF & CC guidelines.
14. 1478 nos. of RWH structures are proposed for the Expressway.
15. Waste Management :
 - No such waste will be generated from the project. Top soil generated will be reutilized for filling borrow area, plantation and on slopes for Turfing.
 - The municipal solid waste generated from the labour camps will be collected & disposed suitably in compost pit and/or transported in covered trucks to approved municipal disposal sites by the contractors, if required.

- No hazardous waste or material (as per Hazardous Waste Management Rules) will be generated from the project road. However, used oil and lubricants will be sold to the authorized recycler.
- Hazardous Wastes (Management and Handling) Rules, 2016 to be enforced.
- No industrial process waste will be generated from the proposed project road.
- No sewage sludge is expected. Septic tank will be constructed for waste disposal in all the camp sites.

16. The proposed project is covered under category 7 " f " of EIA Notification, 2006 (as amended).

Based on the recommendations of the State Level Expert Appraisal Committee Meeting (SEAC) held on 24/12/2016 the State Level Environment Impact Assessment Authority (SEIAA) in its Meeting held on 13/02/2017 decided to grant the Environmental Clearance for proposed project along with subject to the effective implementation of the following general and specific conditions:-

General Conditions:

1. A comprehensive EIA shall be undertaken taking into view conditions stipulated in this clearance also and submitted to this Authority within 02 years of commencement of the project. The comprehensive EIA study should also include:
 - I. The detailed impact analysis under the scope of work particularly the impact on ambient air quality interpreting the incremental concentration of the various parameters based on air quality models.
 - II. The specific target group in the predominant wind directions.
 - III. Critical traffic analysis for the construction and the operation phases based on eco-friendly fuels in order to formulate an action plan to keep the surrounding air quality confirming to its present level/the prescribed norms.
 - IV. Efforts to utilize the fly ash to the maximum level and the natural clay/soil to the minimum level should be made.
2. Permission for any tree felling shall be taken from Forest Department as per law. In addition to the proposed compensatory plantation (3 Trees planted for every tree cut) it shall be ensured that adequate plantation on both sides of proposed expressway shall be undertaken with shade giving, ecologically friendly, sound absorbing and native species of trees to attenuate probable air and noise pollution. A densely populated green belt in both sides of the expressway shall be developed.
3. The implementation of the environmental management plan should be reviewed every 06 months by the project proponents and the Action Taken Report should be submitted to this authority, UPPCB, and the concerning District Magistrate.
4. The project proponent will set up separate environmental management cell for effective Implementation of the EMP etc as well as stipulated environmental safeguards under the supervision of a Senior Experienced Executive.
5. Full support should be extended to concerned officers/authorities by the project proponents during their inspection of the project for monitoring purposes by furnishing full details and action plan, including action taken reports in respect of mitigative measures and other Environmental protection activities.
6. A Six Monthly monitoring report should be submitted to the Authority regarding the Implementation of the stipulated conditions.
7. The E.I.A. Authority or any other competent authority may stipulate any other conditions or environmental safeguards, subsequently, if deemed necessary, which should be complied with.

8. First aid centers along the highway should be identified with referral facility for nearby trauma centers for causality management.
9. Regular noise levels should be monitored during construction and operation phase.
10. The date and place of sampling of water testing should be provided along with the quality of water as suitable for drinking purposes alongwith compliance report.

b. Specific Conditions:

1. Source of water-required water shall be met by rivers and canals wherever it is possible. In no other option borewell may be recommended after obtaining permission competent authority.
2. Way in motion should be provided.
3. Felling of trees only after obtaining NOC from the competent authority.
4. Vehicle having PUC certificate should be use.
5. Safe drinking water for labours should be provided.
6. 100 PPM, PM₁₀ must be achieved.
7. Continuous online AAQ monitoring at every 100 KM interval to be done.
8. Trauma center alongwith refreshment center at every 50 KM to be provided.
9. Drainage line and provision of lighting on both side of the road side should be provided.
10. Traffic light signal at each crossing and at diversion point to be provided.
11. Name of approaching town with mileage sign to be provided.
12. Mining permission from competent authority should also be taken.
13. The project proponent should incorporate and implement all suggestions given in the public hearings regarding the project.
14. The construction work shall be undertaken in a manner that the active channel, flow and direction rivers coming under proposal should not be disturbed. The active channel width shall be as certified by Central Water Commission and shall keep into account the flood flows also. The project in all its phases shall ensure that there is no such activity that may affect/result in change of flow (quantity and direction) of river or silting of the river or its tributaries.
15. Detailed project report/feasibility report may be sent to chairman/all members of the committee.
16. The use of plastic waste in the construction of the Highway shall be explored. It is suggested that the crusher's dust can be used along with plastic waste in construction of road.
17. The fly ash generating potential of the surrounding areas shall be estimated and its use shall be explored in the proposed expressway.
18. All potable water sources near the right of way should be such that they meet drinking water criteria as prescribed. Necessary water recharge facilities shall be constructed near each potable water station.
19. Ground and surface water sources (including rivers and canals) will be used to meet the water requirement during construction phase of the project road subject to permission from the competent concerned authorities. Ways to minimize the water consumption including use of stored rain water should be explored and included in the comprehensive EIA as indicated in condition no. 1.
20. It shall be ensured that the alignment and other project areas are more than 05 Km away from (i) Protected areas notified under the Wild Life (Protection Act, 1972 (ii) Critically polluted areas as notified by the Central Pollution Control Board from time to time (iii) Notified Eco-Sensitive areas (iv) Inter-State boundaries and International boundaries.
21. For any extraction of ground water, prior permission from CGWB shall be taken.



22. Construction material shall be so handled that wastes do not find their way into water bodies. Wastes shall be suitably collected and treated as per standards. Necessary consents shall be obtained from the competent authority in this regards.
23. Separate Environmental Clearances as applicable shall be obtained for any subsidiary activities like rest areas, automobile repair shops etc planned in the project area as per EIA notification.
24. Measures should be taken to protect the ponds along the proposed alignment that may likely to be affected. Wetlands within the study area of the project should be identified and it shall be ensured that there is no eco-degradation of these wetlands as a result of the project. Details shall be submitted with the comprehensive E.I.A.
25. The CNG station should be established for proper functioning of vehicles to control pollution on the proposed highway.
26. The operation and maintenance of dust monitoring to be reviewed after every six months.
27. Rain water harvesting sites should be developed where ever possible as per norms.
28. The project proponent should obtain necessary permission from the State Irrigation Department before drawing water from the river sources for the purpose of the proposed construction activity. Prior permission from the concerned Authority should be taken for any abstraction of groundwater.
29. Noise barriers should be provided at appropriate locations particularly in the areas where the alignment passes through inhabited areas, so as to ensure that the noise levels do not exceed the prescribed standards and comply with provisions given under Noise Rules 2000 (as amended) for silence zone as defined under the rules.
30. Rest areas with facilities like toilets and refreshment may be included along the expressway.
31. Provision of trauma center/medical facilities is to be provided on this expressway within convenient distance.
32. It is suggested that in between two ways of the road the height of the divider on both side of the green verge should be such that no traffic like motorcycle, cycle, and tractor can cross over. It is also suggested that it will be better if in between two roads strong railing could be provided with sufficient height.
33. Overloading factor should be adequately incorporated during design and construction of the expressway.
34. Adequate drainage structures should be provided along the entire length of expressway so that no conditions of water stagnation are created. Near the settlement areas, drainage structures shall be covered.
35. Relocation of temples and other cultural properties like mosques, schools, hospitals etc, along the proposed alignment, shall be taken-up only after permission from competent authority/local administration.
36. Suitable measures shall be taken to educate highway users on the risk of HIV and human trafficking. Environmental and safety awareness drives through hoardings should also be promoted.
37. On every toll barriers Weigh Bridge is to be installed to check the load of the trucks and restrict the over loaded vehicles and comply as per the capacity design of the road.
38. Separate clearances from the competent authority shall be obtained regarding acquisition of water bodies, forest land, cultural sites etc. Such clearances shall take into consideration minimum impact options.
39. Sand and aggregates shall be obtained from approved quarries only. Borrow areas shall have the approval of the competent authorities.
40. Acquisition of land should be as prescribed under Govt. Rules.

41. Dredged material from road side ditches should be suitably disposed as not to cause any environmental problem. Necessary permission shall be obtained from the competent authority in this regard.
42. Consent for discharge of effluents from workers camp and other construction activity should be obtained from competent authority.
43. Borrow pits should be so selected so as to have minimum loss of productive land.
44. Separate NOC and consent of the UPPCB shall be obtained with regards to asphalt plants, crushers, batching plants, hot mix plants etc.
45. Landfill sites for earth, stone or other construction material shall be duly approved by the competent authority.
46. The alignment shall be so maintained that there is no Archeological or cultural property in the project area.
47. The proposal should conform to Regional Development Plan for the area and if non conforming, suitable permission should be taken before construction from the competent authority.
48. Adequate provision for infrastructure facilities including water supply, fuel and sanitation must be ensured for construction workers during the construction phase of the project in order to avoid any damage to environment.
49. Appropriate measures must be taken while undertaking digging activities to avoid any likely degradation of water quality and other incidents.
50. Borrow pits for earth, quarry sites for road construction material and dump sites must be identified keeping in view the following:
 - a) No excavation or dumping on private property is carried out without consent of the owner.
 - b) No excavation or dumping should be allowed on wetlands, forest areas, protected or prohibited land or other ecologically valuable or sensitive locations.
 - c) Excavation work should be done in consultation with the Soil Conservation and Watershed Development Agencies working in the area.
 - d) Construction spoils including bituminous material and other hazardous materials must not be allowed to contaminate water courses and the dump sites for such materials must be secured so that they should not leach into the ground water, and necessary permission from the UPPCB be obtained.
 - e) During the earthwork on embankments care is to be taken regarding environmental pollution. The adequate number of sprinkles should be used during the operation period.
51. Adequate precautions and norms should be followed during transportation of the construction material so that it does not affect the environment adversely.
52. Borrow pits and other scars created during the road construction should be properly leveled and treated.
53. Possibility of use of non conventional energy sources may be explored.
54. Municipal solid waste & Hazardous waste shall not be used in the construction of the express way.
55. Automatic traffic signal is to be provided at all crossing functioning during day and night.
56. During foggy weather the vehicular traffic may be held with parking facilities to avoid accidents.

No construction/operation is to be started without obtaining Prior Environmental Clearance. Concealing factual data and information or submission of false/fabricated data and failure to comply with any of the conditions stipulated in the Prior Environmental Clearance attract action under the provision of Environmental (Protection) Act, 1986.

This Environmental Clearance is subject to ownership of the site by the project proponents in

confirmation with approved Master Plan for Lucknow, Barabanki, Amethi, Sultanpur, Ambedkar Nagar, Faizabad, Azamgarh, Mau and Ghazipur. In case of violation, it would not be effective and would automatically be stand cancelled.

You are also directed to ensure that the proposed site is not a part of any no-development zone as required/prescribed/identified under law. In case of violation, this permission shall automatically deem to be cancelled. Also, in the event of any dispute on ownership or land use of the proposed site, this clearance shall automatically deemed to be cancelled.

The project proponent will have to submit approved plans and proposals incorporating the conditions specified in the Environmental Clearance within 03 months of issue of the clearance. The SEIAA/MoEF reserves the right to revoke the environmental clearance, if conditions stipulated are not implemented to the satisfaction of SEIAA/MoEF. SEIAA may impose additional environmental conditions or modify the existing ones, if necessary. Necessary statutory clearances should be obtained and submitted before start of any construction activity.

These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006 including the amendments and rules made thereafter.

This is to request you to take further necessary action in the matter as per provision of Gazette Notification No. S.O. 1533(E) dated 14.9.2006, as amended and send regular compliance reports to the authority as prescribed in the aforesaid notification.



No..... /Parya/SEAC/3696/2016

Dated: As above

Copy with enclosure for Information and necessary action to:

1. The Principal Secretary, Department of Environment, Govt. of Uttar Pradesh, Lucknow.
2. Advisor, IA Division, Ministry of Environment, Forests & Climate Change, Govt. of India, Indira Paryavaran Bhawan, Jor Bagh Road, Aliganj, New Delhi.
3. Chief Conservator, Regional Office, Ministry of Environment & Forests, (Central Region), Kendriya Bhawan, 5th Floor, Sector-H, Aliganj, Lucknow.
4. District Magistrate, Lucknow/ Barabanki/ Amethi/ Sultanpur/ Ambedkar Nagar/ Faizabad/ Azamgarh/Mau/ Ghazipur.
5. The Member Secretary, U.P. Pollution Control Board, TC-12V, Paryavaran Bhawan, Vibhuti Khand, Gomti Nagar, Lucknow.
6. Regional Officers, Regional Office, UP Pollution Control Board, Lucknow/ Barabanki/ Amethi/ Sultanpur/ Ambedkar Nagar/ Faizabad/ Azamgarh/ Mau/ Ghazipur.
7. Copy to Web Master/ guard file.

(Shruti Shukla)
Deputy Director,
Directorate of Environment, U.P.

Before the Hon'ble National Green Tribunal, Delhi

Vakalatnama

Original Application No. 170 of 2022

Anupam Verma

..... Applicant

Versus

State of Uttar Pradesh

.....Respondent

We the undersigned do here by nominate and appoint Sri Panshul Chanra, Advocate (Registration No.UP/5411/2014), R/O- Flat No. 298, Eldeco Yammuna Enclave, Sector – 28,Noida Gautam Budh Nagar, U.P. to be counsel in the above matter and for we and on me behalf to appear, plead act and answer in the above and for we and on appellate Court or any Court to which the business is transfer in the above matter, and to sign and file petitions, statements accounts, exhibits, compromises or other documents whatsoever, in connection with the said matter arising there from, and also to apply for and receive all documents or copies of documents, depositions, etc. and also to apply for and to apply for issue of summons and other writs or subpoena and to apply for and get issued any arrest, attachment or order execution warrant or order and to conduct any proceeding that may rise there out and to apply for and receive payment of any or all sums or submit the above matter to arbitration.

Provided, however, that, if any part of the Advocate's fees remains unpaid before the first hearing of the case or any hearing of the case by fixed beyond the limits of the town, then, and in such an event our said advocate shall not be bound to appear before the court and if may said advocate does appear in case he shall be entitled to an outstation fee and other expenses of traveling, lodging, etc. Provided also that if the case be dismissed by default, or if it be proceeded ex-party, the said advocate shall not be held responsible for the same and all whatever our said advocate shall lawfully do, we do here by agree to and shall in future ratify and confirm.

ACCEPTED:



(Panshul Chandra)

Advocate

Mobile No.8447042569

Dated:



Signature of the Client

(Awanish Kumar Awasthi)
Chief Executive Officer
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