BEFORE THE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI
APPEAL NO. 17 OF 2021

IN THE MATTER OF:

UNIVERSITY OF DELHI ... APPELLANT

VERSUS

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE & ORS ... RESPONDENTS

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748-A

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AFFIDAVIT-IN-REPLY ON BEHALF OF RESPONDENT NO.2

TO THE APPEAL FILED BY THE APPELLANT

1. The present Affidavit-in-Reply is being filed by the Respondent No. 2, Young Builders Pvt. Ltd. ("**answering Respondent/ Project Proponent**"), to the Appeal filed by the Appellant. At the outset, the answering Respondent denies all allegations as made by the Appellant in the captioned Appeal and submits that nothing stated therein may be deemed to be admitted for want of a specific traverse.

2. The Appellant has filed the captioned Appeal impugning the grant of the third (3rd) Environment Clearance ("**EC**") dated 21.05.2021, granted by the Ministry of Environment and Forests and Climate Change ("**MoEF & CC**") (Respondent No. 1) to Young Builders Pvt. Ltd., Respondent No. 2 herein. The EC was granted for the construction of a residential group housing project ("**the Project**") on a parcel of land admeasuring 2.0 ha. adjoining the Vishwavidyalaya Metro Station which was leased by the Delhi Metro Rail Corporation ("**DMRC**"). The DMRC had conducted a public auction in

2008, for the construction of a residential group housing project, wherein the answering Respondent's bid of Rs. 218.2 Cr. was accepted. The auction price was paid in full, vacant possession was handed over in January 2009 and DMRC executed Lease Deed in favour of answering Respondents on 19 February 2013 for a period of 90 years.

PRELIMINARY SUBMISSIONS

3. The instant Appeal filed by the University of Delhi is an abuse of process, motivated with somehow preventing a legitimate, legal, group housing project coming up on a plot meant for residential use in a planned residential development zone.

4. At the outset, it must be clarified that the Project is not located in "*North Campus, area of University of Delhi".* The Appellant is misleading this Hon'ble Tribunal by alleging that the Project is being constructed within in the confines of an area called "*North Campus area of University of Delhi*", at various places in the Appeal. Further the aforementioned submission made by the Appellant has been categorically rejected by the Hon'ble High Court of Delhi *vide* Order dated 27.04.2015, which was subsequently upheld by the Apex Court *vide* its Order dated 17.12.2019. Further, the same also stands fortified by the Layout Plan of North Campus approved by the North Delhi Municipal Corporation. Additionally, there is nothing called "controlled zone" under MPD-2021.

5. It is submitted that the Environmental clearance for constructing the Project has already been examined four times over as follows:

   (i) The State Level Expert Appraisal Committee ("**SEAC**"), comprising of 5 expert members and 3 expert invitees,

after conducting a detailed examination of the Project, recommended the grant of EC for the Project to the State Level Expert Environmental Impact Assessment Authority ("**SEIAA**"), comprising of 3 expert members, which in turn granted the first (1st) EC on 13.08.2012. Pertinently, this was not objected to by the Appellant University. Since the Project could not be constructed due to the litigation initiated by the Appellant before the Hon'ble High Court of Delhi at New Delhi ("**Hon'ble Delhi HC**") (delineated below), the EC expired with efflux of time.

(ii) On 22.03.2018, the Project was re-examined by the SEAC comprising of 8 expert members, which after detailed presentations and examination recommended the grant of another EC for the Project to the SEIAA, Delhi, comprising of 3 expert members, which then granted the second (2nd) EC to the answering Respondent.

(iii) The Expert Committee appointed by this Hon'ble Tribunal in Appeal No. 112 of 2018, comprising of 9 expert representatives from 9 different independent institutions conducted an independent carrying capacity assessment of the Project, and submitted its Rapid Indicative Environment Assessment Report before this Hon'ble Tribunal on 10.12.2020. ("**2020 Expert Committee Report**") After analysing the population density, ground water, ambient air and noise quality, traffic management and parking, the Committee found that the Project was environmentally viable.

(iv) Yet again, the Project was presented in detail and closely examined by the Sectoral Expert Appraisal Committee ("**EAC**") of the MoEF comprising of 14 expert members which recommended the grant of EC to the Project on 13.04.2021. The subject, third (3rd) EC was granted on 21.05.2021 by the MoEF, which is challenged in the present proceedings.

6. It is respectfully submitted that over a period of nine (9) years, almost 42 independent, expert members through various committees have examined the project and granted clearance, subject to imposition of various conditions from time-to-time.

7. The answering Respondent has, in fact, become a victim in the process. The Respondent had put trust and faith in an auction conducted by a Government Corporation, DMRC, for auction of a residential plot for construction of a residential group housing project. The Project Proponent made payment of Rs. 218.2 crores, with the hope and trust that it would be able to immediately start construction and develop the residential project.

8. However, the repeated objections, complaints and impediments put by the Appellant University have already caused a delay of 9 years and have caused incalculable loss to the Respondent. These submissions by the University of Delhi have been rejected by a Ld.Single Judge of the Hon'ble Delhi High Court, whose judgment was upheld by the Division Bench and also by the Hon'ble Supreme Court. Virtually, the same objections are being raised again and again by the University of Delhi which is nothing but an abuse of process.

9. The following environmental objections have been raised by the Appellant University:
   (i) The ground water in the Project Site is depleted;
   (ii) The Appellant has not correctly calculated the water required for the construction and operation phase of the Project;
   (iii) The ambient air quality and noise levels in the area are above permissible limits;
   (iv) The Traffic Management Plan submitted by the answering Respondent is erroneous;
   (v) The Project is susceptible to liquefaction and seismicity;
   (vi) The Project is near the Northern Ridge and poses a threat to the same;
   (vii) The Project is located near critically polluted areas.

10. Each of the aforesaid objections were made before all the Committees and there has been a complete application of mind, and only thereafter has the EC been granted.

11. It is respectfully submitted that the objections raised in the present Appeal before this Hon'ble Tribunal were raised even before the EAC. The EAC called for clarifications and responses from the Project Proponent on 01.03.2021, which were submitted on 22.03.2021, and after due consideration and application of mind, has imposed specific conditions which would show due application of mind.

12. It is pertinent to note that the objections raised before the EAC have been the same which were raised before this Hon'ble Tribunal in Appeal No. 112/2018, which challenged the answering Respondent's 2nd EC dated 22.03.2018, and also before the Expert Committee appointed by this Hon'ble Tribunal in Appeal No. 112 of 2018. It is respectfully

submitted that 42 expert members have applied their mind to the project and have granted EC, there should be no occasion for the Appellant to again and again challenge the same on some pretext or the other. The objection of the Petitioner, therefore, is clearly not *bona fide*.

13. The EIA notification of 2006 categorises projects under two broad categories, i.e., Category A and B, depending on the scale and impact of the Project activities. Within Category B, there is a further sub-division into Category B1 and Category B2, based on the project impact. All Category A and B1 projects, due to their environmental footprint, require public consultation. The remaining category is B2, wherein there is no requirement of public consultation. The present Project admittedly falls under Category B2, and there is no requirement of any public consultation. Despite there being no requirement of public consultation, the Appellant has been permitted to make objections time and again, and despite the same having been rejected the Appellant is continuing to delay the project for the same reasons.

14. It is respectfully submitted that since all objections that have been made, have been duly considered by the relevant committees not once but four times over, the scope for review is limited. The Hon'ble Supreme Court, in the case of ***Rajeev Suri v. DDA & Ors.*** reported at ***2021 SCC Online SC 7*** ("***Central Vista Case***") has held that,

> *"494. […]EAC is an expert body and it is amply clear that it has been made aware of all relevant information relating to the project and it has applied its mind to the proposal.* ***. Even on settled principles of judicial review, it is clear that relevant material has been considered by the committee and no reliance has been pointed out on***

any irrelevant material. The specific recommendations given by the committee do indicate that the committee was aware of the need for precautionary measures in environmental matters and accordingly, it suggested requirement of further permissions on certain counts.

495. Once an expert committee has duly applied its mind to an application for EC, any challenge to its decision has to be based on concrete material which reveals total absence of mind. Absent that material, due deference must be shown to the decisions of experts."

15. The *mala fide* and the obstructionist attitude is apparent from the fact that apart from the environmental objections, following other issues have been raised, which have been rejected by the High Court and the Hon'ble Apex Court, and are being raised time and again –

(i) That a high rise building is not permitted in the University area in view of Clause 11.3 of the Master Plan for Delhi-2021 ("**MPD-2021**");

(ii) The Project is located in the alleged controlled Zone-C as per the MPD-2021 (when there is none);

(iii) The Project will aggravate the parking problems and the traffic situation in the area;

(iv) The Project will affect the privacy of the girls hostels in the vicinity.

16. It is important to note that the Project in question is construction of residential apartments in a plot designated for residential use in a planned residential development zone. The Answering Respondents will be constructing and providing almost equal number of EWS apartments (224

dwelling units). Further, the building plans have been duly sanctioned twice by the Sanctioning Authority – North Delhi Municipal Corporation. (Last approval on 23.07.2021)

17. Admittedly, various policy documents of the Government, including the MPD-2021 (Vision – Clause 3,6 and 7) disclose that there is a shortage of residential accommodation and there is a need to construct planned residential accommodation and upgrade residential infrastructure in Delhi to meet future demands for housing. The MPD-2021 further notes that the most important aspects of planned development pertains to the provision of adequate well-planned shelter and housing for the different categories of inhabitants of the city. In addition, in the Major Highlights of the MPD-2021, it is noted that

"(d) ***Shelter:***

- ***Shift from plotted housing to group housing for optimal utilization of land****;*
- ***Private sector participation for development / redevelopment of housing;***
- ***Removing unnecessary controls (like height) for optimum utilization of land and to facilitate creation of 'signature' projects.***
- *Enhancement of ground coverage, FAR and height for all categories of residential plots."*

18. It ought to be noted that there is absolutely no environmental harm envisaged in the Project since this is a one-time construction project in a planned residential development zone and not a continuous polluting industry.

19. That the following expert agencies/bodies have applied their mind and given clearance to the project:

Sr. No.	Particulars	Approval Date(s)
1.	North Delhi Municipal Corporation – Layout Plan	19.08.2020, 17.11.2017, 08.07.2015, 11.04.2013
2.	North Delhi Municipal Corporation – Building Plan Sanction	23.07.2021, 31.07.2019
3.	Delhi Jal Board (water supply)	07.10.2015
4.	Delhi Jal Board (Sewerage)	11.01.2016
5.	Delhi Jal Board (Service Plans)	05.06.2021, 09.07.2019
6.	North Delhi Municipal Corporation for storm water / drainage	24.11.2015
7.	Delhi Fire Service	12.07.2021, 12.07.2019, 08.09.2017, 15.01.2016, 13.01.2015, 06.02.2013, 13.03.2012
8.	Delhi Urbans Art Commission	17.07.2021, 11.07.2019, 16.08.2017, 11.02.2016, 13.02.2015, 06.02.2013, 19.12.2012
9.	Airports Authority of India (no longer required)	28.06.2011, 16.04.2009
10.	Dept. of Wildlife, Government of Delhi – Tree felling approval	25.05.2011

11.	National Monument Authority	26.12.2012
12.	Archaeological Survey of India	08.05.2009
13.	Tata Power Delhi Distribution Ltd.	14.08.2013

A Copy of the Approvals obtained for the Project is annexed herewith and marked as ***ANNEXURE R-1. (From Pg. 885*** **)**

20. The aforesaid shows that there has been a multiple layered decision making process in the last 12 years which has resulted in grant of various clearances from time to time and therefore, there is no occasion to seek a judicial review once again.

21. The Office Memorandum dated 10.11.2015, issued by the MoEF & CC lays down the procedure to be followed by the EAC while appraising building and construction projects under Entry 8 to the EIA Notification. Further, the said OM also notes the various criterion the EAC must analyse while granting ECs to such projects such as the Waste Water Treatment, Water Balance Chart, Solid Waste Management etc. A bare perusal of the EC as well as the Minutes of Meeting of the EAC would reveal that the above noted criterion have been thoroughly followed by the EAC while appraising the Project.

22. It is submitted that the Appellant has time and again misused its reputation as a premier educational institution to attempt to delay/stop the Project of the answering Respondent, one way or the other, for the last 9 years. In fact the Appellant does not have genuine regard for the environment which is borne out from the fact that the Ministry of Environment, Forests & Climate Change ("**MoEF & CC**") and the SEIAA

have granted Environmental Clearances to at least eight (8) other large-scale Building & Construction projects in Delhi, which are currently under construction, of which six (6) projects are in the same zone, i.e. North Delhi/Civil Lines, and out of which three(3) are in the close vicinity of the answering Respondent's Project. However, no objection has been raised against the aforesaid Projects and the Appellant has arbitrarily and selectively challenged the EC granted to the present Project. The said ground is elaborated in detail at paragraph 43-46 below. Therefore, the Appellant has filed the present Appeal for *mala fide* and oblique reasons without having any true concern for the environment.

23. Further, the Appellant has also supressed and misrepresented material facts which are stated hereinbelow.

A. <u>SUPRESSION BY THE APPELLANT</u>

24. The Appellant has approached this Hon'ble Tribunal with unclean hands inasmuch as the Appellant has deliberately and wilfully suppressed material facts solely with the view to prejudice this Hon'ble Tribunal. On this ground alone, the present Appeal ought to be dismissed. In the case of ***Shri Rohidas Narvekar & Anr. Vs. GCZMA & Ors.*** reported at ***2014 SCC Online NGT 3219,*** this Hon'ble Tribunal held that suppression of material fact by itself is sufficient reason to dismiss an Appeal. Further, the Hon'ble Apex Court has held ***G. Narayanaswamy Reddy v. Govt. of Karnataka*** reported at ***(1991) 3 SCC 261*** that a person who approaches the Court for relief must come with frank and full disclosure of facts and if he fails to do so and suppresses material facts, his application is liable to be dismissed.

25. The following material facts have been suppressed by the Appellant,

    i. In March 2010, a Report was published by a three member Joint Committee constituted by the Hon'ble Lieutenant General of Delhi, in order to assess the objections to the Project, as raised by the Appellant. The Committee, after a detailed survey of the project site and surrounding areas, in its majority opinion, found that the Project was entirely legal, did not pose a threat to the parking in the area, did not violate any norms in the MPD-2021 and will not affect the privacy of the girls hostel. However, the Engineer Member, DDA gave a dissenting opinion. The Appellant has only referred to the dissenting opinion and misrepresented the same as the opinion of the entire Committee. Further, the Appellant has not annexed or informed this Hon'ble Tribunal of the main/majority opinion. In the present Appeal, the Appellant has stated as follows,

> *"**Report of committee constituted by L.G. Delhi gave finding that the project would have adverse impact on traffic load and on ambience of Delhi University***
>
> *25.pp.That further, the Hon'ble L.G. of Delhi constituted a Committee on 17.02.2010 under the Chairmanship of the Engineer Member of DDA (other members being the Chief Town Planner, MCD and Chief Engineer, DMRC) to survey the entire area and examine the implications of the proposed high-rise buildings on the privacy and integrity of the environment of the University of Delhi. The Engineer Member, DDA submitted a Report stating that there was no agreement among the members of the Committee. However, in his Report dated 27.04.2010, the Engineer Member, DDA submitted that any intervention at the doorstep of Delhi University constructing a high rise building of 8 stories or so will amount to a grave intervention*

on the ambience of Delhi University and will add to a considerable traffic load on two lane roads of Delhi University which will further effect tranquil ambience of the campus. One can imagine the manifold damage the now proposed 39-storey structures can cause to the environs of the University Enclave."

The above passage squarely brings to light the concealment and suppression undertaken by the Appellant since not even a whisper is made regarding the main/majority Report of the Committee. Further, it is pertinent to note that as per the Majority Report, the Engineer Member, DDA did not even attend the site inspection with the rest of the committee members.

A Copy of the Report dated March, 2010 submitted by the Joint Committee appointed by the Hon'ble Lieutenant General of Delhi is annexed herewith and marked as ***ANNEXURE R-2. (From Pg. 886 to 894)***

ii. Further, the Appellant also approached the State Expert Appraisal Committee, Delhi ("**SEAC**") with its objections in 2012. The SEAC further constituted a sub–committee to look into the said objections, granted an opportunity of personal hearing to the Appellants which was availed by them. On 09.02.2012, the Report of the SEAC Sub-Committee was published which *inter alia* reported that,

(a) The apprehensions of the Appellant University regarding the parking blockade and projected traffic are not correct as there is no traffic problem in Cavalry Lane, and neither will the movement and inflow of students be hampered as a result of the project of the answering Respondent;

(b) The Project Proponent (answering Respondent herein) has received the requisite tree cutting permission and therefore the contentions of the Appellant University are mere apprehensions.

A Copy of the Report dated 09.12.2012 of the SEAC Sub-Committee is annexed herewith and marked as ***ANNEXURE R-3. (From Pg. 895 to 903)***

Even the said Report has been entirely supressed by the Appellant in the instant Appeal. This report was never challenged by the Appellants.

iii. It is shocking that the Appellant has not even made a single reference to the Orders of the Single Judge, Division Bench or the Hon'ble Apex Court in the proceedings wherein the Appellant itself had challenged the Project, *inter-alia* on the grounds of non-compliance with municipal norms, and specifically the non-imposition of height restrictions by the DDA. It is pertinent to note, that *vide* Order dated 27.04.2015, the Ld. Single Judge of the Hon'ble High Court had dismissed WP (C) No. 2743/2012 filed by the Appellant and held that,

> "*58. The claim of the petitioner is that the 3.05 Hectare land falls in the 'controlled zone' of Delhi University and that a height restriction ought to have been imposed on the Project otherwise it will be in direct conflict with MPD 2021. However, as submitted by ld. Counsel for respondents that there is nothing called "controlled zone" of Delhi University under MPD 2021 or Zonal Development Plan for Zone-"C". **However, MPD 2021, Chapter 11-Urban Design, Para 11.3** provides that restriction on tall buildings would be necessary in important areas like Lutyen's Bungalow Zone, Civil Lines Bungalow Zone and North Delhi Campus**. The***

plot in question does not fall within any of these restricted areas. In any case, the same was also established by respondent No.12 during arguments by showing the Zonal Development Plan for Zone-'C (Civil Lines Zone) that the land in question does not fall within any restricted area in Zone-"C" i.e. the Civil Lines Bungalow Zone or the North Delhi Campus. In fact that land does not fall within Delhi University North Campus which is established from the information obtained by respondent No.12 under RTI wherein it is stated that the 3.05 Hectare plot is not a part of Delhi University"

Further, the Appellant has failed to disclose the Order dated 29.10.2018 passed by the Division Bench of the Hon'ble High Court in LPA No. 89 of 2018 wherein the Order of the Ld. Single Judge, quoted above, was upheld. The Order of the Ld. Division Bench was upheld by the Hon'ble Supreme Court *vide* Order dated 17.12.2019 in SLP(C) No. 5581-82 of 2019. Even the Order of the Hon'ble Supreme Court has been concealed in its entirety.

Pertinently, the Appellant has sought to conveniently conceal these Orders as the Hon'ble High court and the Apex Court, have conclusively decided various issues against the Appellant, that are now being re-agitated in the present Appeal.

In light of the above, it is amply clear that the Appellant has concealed vital information from this Hon'ble Tribunal which amounts to patent suppression. Therefore, the present Appeal is liable to be dismissed on this ground.

A Copy of the Order dated 27.04.2015 passed by the Hon'ble High Court of Delhi in W.P.(C) No. 2743 of

2012 is annexed herewith and marked as ***ANNEXURE R-4. (From Pg. 804 to 947).***

A Copy of the Order dated 29.10.2018 passed by the Hon'ble High Court of Delhi in LPA No. 89 of 2018 is annexed herewith and marked as ***ANNEXURE R-5. (From Pg. 948 to969).***

B. ISSUES WHICH HAVE ATTAINED FINALITY BEFORE THE HON'BLE HIGH COURT AND SUPREME COURT AND ARE THUS HIT BY THE PRINCIPLE OF RES JUDICATA

Before responding to the environmental issues raised by the Appellant, the answering Respondent would briefly place the findings rendered by the Hon'ble High Court and Hon'ble Supreme Court in previous proceedings filed by the Appellant, which have attained finality. Therefore, the Appellant is squarely barred from raising the same issues based on the principle of *res judicata.* The Appellant has a history of filing several frivolous proceedings against the Project, which have been repeatedly dismissed by the Hon'ble High Court and the Hon'ble Supreme Court. It is extremely unfortunate that despite being aware of the same, the Appellant is re-agitating these issues in order to prejudice and mislead this Hon'ble Tribunal despite the same being already settled by the Court(s) of competent jurisdiction.

THERE ARE NO HEIGHT RESTRICTIONS ON THE PROJECT BUILDINGS SINCE THE PROJECT IS NOT LOCATED IN CONTROLLED ZONE 'C'/ NORTH CAMPUS AREA

26. As stated above, the Joint Committee appointed by the Lieutenant General of Delhi had published its Report in March, 2010 and *inter alia* found that that high rise

constructions are permitted in the area and the construction is permissible as per the municipal norms enshrined in MPD-2021.

27. On 07.05.2012, the Appellant filed W.P.(C) No. 2743 of 2012 before the Hon'ble High Court of Delhi alleging that the Project is illegal and violative of the norms of MPD-2021. *Inter-alia*, the following prayer was sought by the Appellant,

> *"a. Issue a Writ of Certiorari in favour of the Petitioner and against the Respondents thereby quashing/setting aside the impugned decision taken by the Respondent No.3, i.e. DDA in its meeting held on 12th May, 2011, wherein* ***the Respondent No.3 while acting contrary to the mandate of the Master Plan Delhi-2021 and the development control norms for metro stations*** *as stipulated under Chapter 12 of the Master Plan Delhi—2021* ***has so allowed the Respondent No.12, i.e. M/s Young Builders (P) Limited to construct a high rise multi story group housing society in the control zone of Zone-****C and has further by virtue of the impugned decision* ***has been pleased to allow development control norms as available to any group housing under MPD-2021, including FAR of 200 and maximum ground coverage of 33.3%, without any height restrictions*** *and has further allowed the plot leased out of the Respondent No.12 by the Delhi Metro Rail Corporation i.e. Respondent No.10 i.e. plot admeasuring 2 Hectares as a separate entity segregating it from the total land acquired for metro station i.e. 3 Hectares and has further been pleased to allow development controls as applicable under the clause "Group Housing" as per the provisions of MPD-2021 to the segregated 2 Hectares plot, which act of Respondent No.3 is against the mandate of law and more so is in totally ignorance of MPD-2021, Zonal Plan of Zone 'C' & the provisions of the Delhi Building Bye Laws. "*
>
> (Emphasis Supplied)

A juxtaposition of the above prayer, with the contentions raised in the present Appeal at Paragraphs III, 1, 2, 25(o), 25(s), 25(mm), 25(qq) and 25(ddd) would show that the same allegations are being regurgitated in the present Appeal, with

scant regard for previous findings of Constitutional Courts and the doctrine of *res judicata*.

28. On 27.04.2015, the Ld. Single Judge of the Hon'ble High Court passed the Final Order and Judgment, dismissing the W.P.(C) No. 2743 of 2012 on merits, as well as on account of delay of almost 7-8 years, amounting to latches. In this Order, it was held that,

> "*58. The claim of the petitioner is that the 3.05 Hectare land falls in the 'controlled zone' of Delhi University and that a height restriction ought to have been imposed on the Project otherwise it will be in direct conflict with MPD 2021. However, as submitted by ld. Counsel for respondents that there is nothing called "controlled zone" of Delhi University under MPD 2021 or Zonal Development Plan for Zone-"C".* ***However, MPD 2021, Chapter 11-Urban Design, Para 11.3*** *provides that restriction on tall buildings would be necessary in important areas like Lutyen's Bungalow Zone, Civil Lines Bungalow Zone and North Delhi Campus****. The plot in question does not fall within any of these restricted areas. In any case, the same was also established by respondent No.12 during arguments by showing the Zonal Development Plan for Zone-'C (Civil Lines Zone) that the land in question does not fall within any restricted area in Zone-"C" i.e. the Civil Lines Bungalow Zone or the North Delhi Campus. In fact that land does not fall within Delhi University North Campus which is established from the information obtained by respondent No.12 under RTI wherein it is stated that the 3.05 Hectare plot is not a part of Delhi University***"

The said Order put to rest the allegations raised by the Appellant University, by holding that the Project does not fall in Zone "C", i.e. Civil Lines Bungalow Zone or the North Delhi Campus. Not being a part of the abovementioned alleged controlled zones, no height restrictions apply to the Project. Further, it was categorically held that since the said Project is also not a part of the Delhi University, Clause 11.3 of the

MPD-2021, providing for height restrictions, is not applicable to the Project.

29. On 06.03.2018, the Appellant filed LPA No. 89 of 2018 (after an admitted delay of 916 days) against the order dated 27.05.2015 of the Hon'ble High Court of Delhi. On 29.10.2018, the said intra-court Appeal, which was heard on merits and delay, was dismissed by the Hon'ble High Court on the ground that it is hit by delay and latches of 916 days.

30. On 25.01.2019, the Appellant filed SLP(C) No. 5581-5582 of 2019 before the Hon'ble Supreme Court, against the Order dated 29.10.2018. It is crucial to note that before the Hon'ble Supreme Court the Appellant vociferously raised the issue of privacy of the nearby girls' hostels.

31. On 17.12.2019, *vide* its Judgment reported as ***2020 13 SCC 745*** titled ***University of Delhi v. Union of India & Ors.),*** the Hon'ble Supreme Court dismissed the above SLP(C) No. 5581-5582 of 2019 and upheld the Orders of the Hon'ble High Court dated 27.04.2015 and 29.10.2018***.*** The Hon'ble Apex Court took note of each and every contention raised by the Appellant and resultantly held that,

> *"Leave granted*
>
> *…*
>
> *31. In the matter of condonation of delay and laches, the well-accepted position is also that the accrued right of the opposite party cannot be lightly dealt with. In that regard, rather than taking note of the hardship that would be caused to Respondent 13 as contended by the learned Senior Counsel, what is necessary to be taken note of is the manner in which Respondent 11, DMRC has proceeded in the matter. Respondent 11, DMRC is engaged in providing the public transport and for the said purpose the Government through policy decision has granted approval to generate resources through property development and in that regard the development as earlier indicated, is taken up. Pursuant thereto*

*Respondent 11 has received a sum of Rs 218.20 crores from Respondent 13 as far back as in the year 2008. The said amount as indicated is used for its projects providing metro rail service to the commuting public**. In such circumstance, if at this stage the inordinate delay is condoned unmindful of the lackadaisical manner in which the appellant has proceeded in the matter, it would also be contrary to public interest.***

…

33. Accordingly, the appeals being devoid of merits stand dismissed with no order as to costs. All pending applications shall stand disposed of."

A Copy of the Order dated 17.12.2019 passed by the Hon'ble Supreme Court in SLP(C) No. 5581-82 of 2019 and reported at ***2020 13 SCC 745*** is annexed herewith and marked as ***ANNEXURE R-6. (From Pg.970 to 986)***

32. Accordingly, the Order of the Ld. Single Judge in W.P.(C) No. 2743 of 2012 dated 27.04.2015 was upheld and stood merged with the Order of the Hon'ble Apex Court. Therefore, each of the following allegations *qua* the height restriction as well as other issues detailed below have attained finality.

THE PROJECT DOES NOT POSE ANY THREAT TO PRIVACY OF NEARBY GIRLS HOSTELS

33. *De hors* the fact that the present alleged ground of challenge raised by the Appellant is irrelevant to the present Appeal before this Hon'ble Tribunal. Nonetheless, it is submitted that the Jt. Committee constituted by the Ld. Lieutenant General of Delhi also found in its Report of March, 2010 that "*The proposed high-rise property development on 2.0 Ha. plot will not affect the privacy of the girls' hostel nearby as alleged by the Appellant, as these are at a distance (e.g., Miranda House) and interspersed by other buildings (e.g., Meghdoot Hostel)."* In fact, the Hon'ble High Court, dealt with the said report filed by the Lt. Governor of Delhi and vide its final

order/judgment dated 27.04.2015, passed in the W.P. (C) No. 2743 of 2012 was pleased to observe as follows:

> *"51. Thereafter, the matter was considered in DDA"s meeting held on 17.02.2010, whereby the Lt. Governor constituted a Committee under the Chairmanship of Engineer Member, DDA with Chief Town Planner, MCD and Chief Engineer, DMRC as members to survey the entire area and examine the implications on the proposed high-rise buildings on the privacy and integrity of the Delhi University environment. Accordingly, the Lt. Governor directed that the Committed would give its report within a week. Pursuant to the said direction, a joint inspection of the site was conducted by the committee members on 19.02.2010 whereby observed and concluded that the proposed high rise property development on 2.0 Hectare plot* ***will not affect the privacy of the girls' hostel nearby****, will not add to any parking problem and will also not affect the serenity / tranquillity of University area."*

34. Further, in the SLP(C) No. 5581-5582 of 2019 filed by the Appellant before the Hon'ble Supreme Court, against the Order dated 29.10.2018, the Appellant vociferously raised the issue of privacy of the nearby girls' hostels. In fact, an Application for intervention was filed by the Delhi University Women's Association and by Students of Miranda House and other hostels. However, the arguments *qua* privacy were not accepted by the Hon'ble Supreme Court and thus, the said issue has attained finality.

THE PROJECT WILL NOT ADD TO THE PARKING OR TRAFFIC PROBLEMS IN THE AREA

35. After conducting a site inspection, the Jt. Committee constituted by the Ld. Lieutenant General rendered a specific finding to the effect that, "*The proposed high-rise property development will not add to the parking problem in the area as pleaded by the Appellant, as there is ample parking on both sides of the Metro Station"* and further that, *"The Project*

will not aggravate the parking problem in the area, as sufficient parking has been envisaged at the site itself".

36. In fact, the Report of the SEAC Sub-Committee of 2012, also found that, "*The apprehensions of the Appellant University regarding the parking blockade and projected traffic are not correct as there is no traffic problem in Cavalry Lane, and neither will the movement and inflow of students be hampered as a result of the project of the answering Respondent".*

    Therefore, even the issue *qua* adequacy of parking has been repeatedly raised and dismissed by various authorities.

37. It is also pertinent to note that *qua* the jurisdiction of this Hon'ble Tribunal to deal with issues which are not related to the environment, the Hon'ble Supreme Court has reiterated in the case of ***Central Vista*** held that,

> ***"503. NGT is not a plenary body with inherent powers to address concerns of a residuary character. It is a statutory body with limited mandate over environmental matters as and when they arise for its consideration.*** *In a cause before it, NGT cannot directly go on to adjudicate on concerns of violation of fundamental rights and once the contours of a subject matter traverse the scope of appeal from a grant of EC,* ***the merits review by tribunal cannot traverse beyond the scope of jurisdiction vested in it by the statute****."*

C. <u>JURISDICTION AND STANDARD OF REVIEW BY THE HON'BLE TRIBUNAL</u>

38. Coming to the issue of environmental norms and procedures, it is submitted that the contentions of the Appellant are completely baseless, frivolous and ought to be dismissed. The Application for the EC filed by the answering Respondent was based upon fresh data, reports, scientific studies and

does not contain any suppression. Further, the EC granted to the Appellant, along with the Minutes of the Meeting of the Sectoral Expert Appraisal Committee ("**EAC**") dated 01.03.2021 ***(@ Pg. 455-459, Vol.III, Appeal)*** and 22.03.2021, ***(@ Pg. 540-545, Vol.III, Appeal)*** displays thorough and rigorous application of mind by the authorities, on each and every environmental issue and thus stands the test of the merit review to be conducted by this Hon'ble Tribunal. The abovementioned points have been elaborated upon in later portions of the present Reply.

39. Pertinently, the EAC even permitted the Appellant to file its objections to the Project ***(@Pg.447-454, Vol.III, Appeal)*** and thereafter directed the answering Respondent to respond to the same. After closely studying the response of the answering Respondent to the Appellant's contentions ***(@ Pg. 460-539, Vol.III, Appeal)*** as well as the clarifications sought by the EAC, the EAC recommended the grant of EC for the Project on 22.03.2021.

40. In fact, a bare perusal of the EC would reveal that the Respondent No.1 has imposed stringent conditions upon the answering Respondent, which the answering Respondent is legally bound to comply with. These conditions are also a reflection of the discussion and deliberation with the EAC and include the following specific conditions,

> *"**SPECIFIC CONDITIONS***
> *[…]*
> *x. A detailed traffic management and traffic decongestion plan shall be drawn and implemented to ensure that the service of the roads near project site may not get adversely impacted after the implementation of the project. The plan should stipulate, inter-alia, the path and appropriate time for the movement of vehicles to and from the site. The Plan shall be vetted by concerned agency of the state government.*

xiii. Project Proponent shall obtain necessary permission for dewatering form Central Ground Water Authority. (CGWA)

xiv. Project Proponent shall adopt suitable measures for controlling ground water backing up around the basements as committed."

41. It is crucial to note that the Project of the Appellant was previously scrutinized by a 9-member Expert Committee constituted by this Hon'ble Tribunal in Appeal No. 112 of 2018, which Committee came to the conclusion that the Project is environmentally viable and sustainable. ("**2020 Expert Committee Report**") The said Committee conducted a carrying capacity study with a focus on the ambient air quality and noise levels of the area, the proximity to environmentally sensitive areas such as the northern ridge, and the Committee also conducted a fresh traffic study and assessed ground water situation. ***(@ Pg.252-302, Vol.II of the Appeal)***

42. It is further submitted that in the ***Central Vista Case (Supra),*** the Hon'ble Apex Court considered another Category B2 Project falling under Item 8(a) of the 2006 EIA Notification and laid down the law *qua* the role of Courts/Tribunals while reviewing an EC and held that,

"380. ***….Upon examination of the minutes of meeting dated 23.4.2020 as approved on 30.4.2020 and notice of meeting dated 16.4.2020, we have observed that all documents, presentations, designs etc. were placed before all members of the Committee well in advance and they were equipped enough to examine the subject project within their mandate and advise the Government.*** *In Committee's observation, the grant of no objection is an in-principle approval coupled with a suggestion that "the features of the proposed parliament building should be in sync with the existing parliament*

building". This observation is indicative of the due awareness on part of the Committee of heritage requirements relating to Grade-I precincts. ***Merely because the minutes do not advert to any specific documents already placed before the members of the Committee, it does not follow that the members did not discharge their duty properly. Indisputably, the relevant documents were placed before all the members at least a week before the Committee meeting and understandably, a week's time was granted to all the members for examining the documents.*** *In such circumstances, it cannot be assumed that the documents and presentations escaped the minds of the Committee members until and unless a demonstrable infirmity is shown.*

*492. Upon a close scrutiny of the information supplied in Form I and I-A, documents supplied by the project proponent and appraisal made by the EAC, we are of the view that the grant of EC is in conformity with the mandate of the competent authority and is just and proper****. The project proponent has undertaken various expert studies to prepare a comprehensive traffic management plan, solid waste management plan, water management plan and waste disposal plan. There is ample information on record to show that the project proponent has adequately addressed various facets of the project including source of water, disposal of water, generation of concrete, disposal of concrete, power availability, concerns relating to landscape etc. and the petitioners have outrightly failed to substantiate their apprehensions by placing material on record to the contrary****.***

494. The minutes of the two meetings of EAC are self-explanatory and reveal due application of mind, in light of the principles relating to application of mind enunciated above. We do not wish to repeat the same to avoid prolixity. EAC is an expert body and it is amply clear that it has been made aware of all relevant information relating to the project and it has applied its mind to the proposal. Even on settled principles of judicial review, it is clear that relevant material has been considered by the committee and no reliance has been pointed out on any irrelevant material. The specific recommendations given by the committee do indicate that the committee was aware of the need for

precautionary measures in environmental matters and accordingly, it suggested requirement of further permissions on certain counts.

495. Once an expert committee has duly applied its mind to an application for EC, any challenge to its decision has to be based on concrete material which reveals total absence of mind. Absent that material, due deference must be shown to the decisions of experts*. The facts of the case do not reveal any deliberate concealment of fact/information from the EAC or supply of any misinformation. The petitioners' extensive reliance upon* ***Hanuman Laxman Aroskar*** *is misdirected and will not be of any avail in advancing their cause. We are in complete agreement with the dictum that full and correct disclosure and highest level of transparency are warranted in any application for EC. However, the present case is fundamentally different. The landscape of this project does not involve a greenfield component surrounded by forests and significant wildlife. It does not involve complete non-application of mind regarding a crucial aspect of the project, such as Ecologically Sensitive Zones. The entire basis of scrutiny and appraisal in* ***Hanuman Laxman Aroskar*** *was different. For, it involved a project which mandated compliance with all four stages of EC i.e., screening, scoping, public consultation and appraisal. Whereas, the present project, as already discussed above, is not subject to scoping procedure. In* ***Hanuman Laxman Aroskar****, various details in Form I/I-A were left blank, information regarding trees was actively concealed and absence of reasons coupled with cursory analysis of the application raised substantial concerns of non- application of mind. The fact situation in that case was enough for shaking the judicial conscience and invocation of powers of review.*

*515. We, therefore, upon a thorough examination, decline to interfere in the grant of EC****. The expertise developed by the EAC cannot be undermined in a light manner and as noted above, due deference must be accorded to expert agencies when their decisions do not attract the taint of legal unjustness.*** *[…]"*

D. <u>THE APPELLANT HAS ARBITRARILY AND SELECTIVELY CHOSEN TO CHALLENGE THE PROJECT OF THE RESPONDENT NO.2</u>

43. The motives of the Appellant are crystal clear from its selective conduct inasmuch as it has only challenged the EC granted to the answering Respondent's Project whereas six other building and construction projects in the immediate vicinity of the Appellant University have been granted an EC recently, however, have not been challenged. Thus, the Appellant University is misusing its reputation as an eminent and prestigious University in order to prosecute the answering Respondent for extraneous reasons unrelated to environment protection.

44. It is crucial to note that the Ministry of Environment, Forests & Climate Change ("**MoEF & CC**") and the SEIAA have granted Environmental Clearances to at least eight (8) other large-scale Building & Construction projects in Delhi, which are currently under construction, of which six (6) projects are in the same zone, i.e., Civil Lines/North Delhi. However, no objection has been raised against the aforesaid Projects. It is evident that the baseline environmental indicators such as air quality and noise, as applied to the Project of the Respondent herein, are equally applicable to all such construction projects in the area, in respect of whom no carrying capacity study has been undertaken.

45. Further, many of the other construction projects, when compared to the answering Respondent's Project are, in fact, closer to environmentally sensitive zones such as the Northern Ridge and River Yamuna and have more basement floors than the answering Respondent's Project. Therefore, it

is extremely arbitrary and discriminatory that the Project of the Respondent is being singled out by the Appellant while the several other Projects in the vicinity are permitted to undertake construction.

46. Details of certain Projects in the area surrounding the Respondent's Project are provided hereinbelow,

S. No.	Project	EC Date	Built-up (Sqm)	DU / EWS (Nos.)	Height (Mtr)	Basement	Parking (ECS)	Distance Yamuna (Mtr)	Distance Ridge (Mtr)
1.	Northern India Paint, Canal Road	29.06.21	32,133	DUs - 64 EWS - 38	81.0	1	298		
2.	Godrej, Ashok Vihar	17.06.21	347,102	DUs - 1200 EWS - 622	100.0	2	3308	--	--
3.	Negolice India (M2K)	13.01.21 16.05.07	1,72,855	DUs - 488 EWS - 287	235.0	3	1,801	5310	4200
4.	Parsvnath Landmark	14.07.20 02.07.07	2,55,562	DUs - 505 EWS - 390	125.6	3	3,256	613	425
5.	North Delhi Metro Mall	15.11.19 12.04.16	1,60,375	Not available	44.1	4	1,894	784	76
6.	DLF Home Developers	11.10.19	10,00,726	DUs - 2900 EWS - 1862	179.2	4	8,836	--	--
7.	Delhi Floor	17.09.19	1,32,957	DUs - 346 EWS - 276	165.0	3	1,143	2920	558

	Mills Co. Ltd								
8.	DCM Ltd	19.09.17	10,05,604	Not available	180.0	3	9,858	--	--
9.	Young Builder (P) Ltd	22.05.21	1,37,879	DUs 222 EWS-224	157.8	2	860	1800	500

It is submitted that in the vicinity of the Project, there are 3 projects with 3 or more basements, in contrast to the Project of the answering Respondent, which has 2 basements. It is pertinent to note that the Project is located next an underground Station of the Delhi Metro which is excavated much deeper than the present Project. Further, another Project, namely Parsavnath Landmark, is 425 mtrs from the Northern Ridge and 613 mtrs from Yamuna River, whereas that of the answering Respondent is 500 mtrs away from the Northern Ridge and 1800 mtrs away from River Yamuna. However, the Appellant has not raised any objection to any of the ECs granted to the abovementioned projects. This clearly shows the *mala fide* and vindictive conduct of the Appellant, which does not have any genuine regard for the environment.

A Chart showing details of the other building and construction Projects is annexed herewith and marked as ***ANNEXURE R-7. (From Pg. 987)***

The answering Respondent will now respond to the contentions made by the Appellant in the captioned Appeal, *in seriatim,*

47. The contents of Paragraph 1-24 of the Appeal are denied except those which are matters of record.

In Re: Term of Reference was not provided as per EIA Notification 2006 amended vide Notification dated 17.02.2020 [Paragraph 25(a)]

48. The contents of paragraph 25(a) are wholly denied. The said contention is erroneous and based on a misreading of the Amendment dated 17.02.2020 made to the 2006 EIA Notification. ***(@ Pg. 546-549, Vol.III, Appeal)***

49. The Project is a building and construction project with a built-up area of 137879.64 m2. As per the Schedule to the EIA Notification, Category 8(a) projects include building or construction projects > 20000 sq. meters and <150000 sq. meters of built up area. Thus, the Project is classified under item 8(a) to the schedule of the EIA Notification of 2006. Projects falling under Item 8(a) are categorized as "Category B2" Projects. As per Clause 7(II) of the EIA Notification, only Category A or B1 projects require the preparation of Terms of Reference ("**ToR**"). Thus, the answering Respondent's Project does not require ToR. Further, as per Appendix V of the EIA notification, it is stated that:

> *"Where a public consultation is not mandatory, the appraisal shall be made on the basis of the prescribed application in Form-1 and environment impact assessment report, in the case of all projects and activities (other than item 8 of the Schedule), except in the said project activity falls under category 'B2', and* ***in the case of items 8(a) and 8(b) of the Schedule, considering their unique project cycle, the Expert Appraisal Committee or State Level Expert Appraisal Committee concerned shall appraise projects or activities on the basis of Form- 1, Form-1-A, conceptual plan and the environmental impact assessment report [required only for projects under 8(b)]*** *and make recommendations on the project regarding grant of environmental clearance or otherwise and also stipulate the conditions for environmental clearance."*

50. Further, even in the amended provision substituted *vide* notification dated 17.02.2020, in paragraph 7(i), sub heading II Scoping, it has been specifically provided as under,

> *"(ii) All projects or activities listed under Category "B2" of the schedule shall not require Scoping."*

By way of the new amendment, the requirement for ToR is applicable to "All expansion proposals of existing projects having earlier Prior Environmental Clearance". The answering Respondent's Project is a new Project for which a fresh EC has been obtained. The Appellant is mistakenly trying to argue that the present project is an expansion project, and thus requires the preparation of ToR, which is completely false and based on an erroneous interpretation of the said amendment.

In Re: Wrongful observation made in the impugned EC that the Appeal No.112/2018 was dismissed whereas it was disposed of after withdrawal of EC dated 23.03.2018 by the Project Proponent [Paragraph 25(b)]

51. The contents of paragraph 25(b) are denied. The abovementioned argument is erroneous and based on a cherry-picked reading of the EC. The Appellant, in good faith, ought to have referred to the entire passage in the EC which reads as under ***(@ Pg. 72, Vol.I, Appeal)*** ,

> *" Appeal No. 112 of 2018 was dismissed on 20.01.2021. YBPL requested to seek fresh EC approval due to change in overall project layout because of certain change in Unified Building Bye Law (UBBL) 2016.* ***Hon'ble NGT dismissed the appeal as infructuous and directed YBPL to make a fresh application as per law***"

Therefore, the EC clearly notes that the previous Appeal was dismissed as infructuous and not dismissed simplicitor. This

is yet another desperate attempt by the Appellant to cast aspersions on the EAC as well as the answering Respondent by relying on patent falsehoods.

In Re: Suggestion of Committee constituted under order dated 27.02.2020 of this Hon'ble Tribunal of limiting basement to one due to impact on natural flow of Ground Water not considered [Paragraph 25(c)-(e)]

52. The contents of paragraph 25(c)-(e) are denied. The Expert Committee appointed by this Hon'ble Tribunal in Appeal No. 112 of 2018 had recommended that the Project be limited to one basement. However, it is pertinent to note that the suggestion was never put to the answering Respondent while it was making its presentations before the said Committee. Had the suggestion been informed to the answering Respondent, the answering Respondent would have given an adequate reply to the same. Accordingly, the answering Respondent addressed a letter to the Committee on 24.12.2020, and in Appeal No. 112 of 2018, the answering Respondent had filed its objections to the limited portion of the Expert Committee's report insofar as it recommended 1 basement.

53. While appraising the Project, the EAC in its 62nd Meeting dt. 01.03.2021 had sought information from the answering Respondent regarding the number of basements, in light of the recommendation of the Expert Committee. ***(@ Pg. 459, Vol.III, Appeal).*** Further, the EAC had also sought point-wise replies to the objections raised by the Appellant University.

54. It is submitted that the answering Respondent gave a detailed reply to the clarifications sought by the EAC as well as the

points raised by the Appellant *qua* the number of basements wherein it was submitted that,

(i) Ground water backing up around the basements and impacting neighboring areas is a general consequence of basement construction below ground water levels. However, there are measures widely implemented in such situations and, if correctly designed and constructed, there will not be any significant ground water back up around the basement.

(ii) The basement design in such cases provides for adequate groundwater drainage systems to prevent groundwater backing up around the basement. Whether water is moving across the land surface or through the sub surface, it moves due to gravity. Water moves from an area of high head (or elevation) potential towards an area of low head (or elevation) potential. Installation of soil drains such as a French are also employed to reduce the build- up of moisture in flat areas. After construction of the basement the Ground water would return to its original level.

(iii) Drained cavity systems are also effective, they work by trapping any water that penetrates the structure and channeling it by gravity into a collection sump. The water is then removed by being pumped, out of the basement. The system can be drained by gravity also.

(iv) In general, basements usually have some form of drainage systems built around them. Foundation drainage systems generally include weeping tiles around the outside of the home, which drain to a sewer or a sump pump. These systems are designed to keep the ground water around the foundation lower than the basement floor.

(v) Further, since dewatering is also employed in the construction of Sub water level structures, prior permission for dewatering is a regulatory prerequisite. Accordingly, the answering Respondent has applied for permission for dewatering to the District Advisory Committee on Ground Water of the Govt. of NCT Delhi on 06.08.202. The answering Respondent undertakes to comply with the decision and/or conditions imposed by the Central Ground Water Authority for two basements.

(vi) It is submitted that the said NOC is granted as per the "Guidelines to regulate and control ground water extraction in India" ("**the Guidelines**") dated 24.09.2020 issued by the Ministry of Jal Shakti, Union of India pursuant to the Orders of this Hon'ble Tribunal and the Hon'ble Supreme Court. The Guidelines contain a detailed list of measures to be adopted by the Applicant for monitoring ground water. Further, specific conditions are mandatorily to be followed by the Applicant such as regular monitoring of dewatering discharge, installation of a STP and payment of abstraction charges/ground water restoration charges depending on the level of ground water in the area. Further, the Applicant must submit an impact assessment report prepared by an accredited consultant on the ground water situation in the area giving detailed plan of pumping, proposed usage of pumped water and comprehensive impact assessment of the same on the ground water regime. Therefore, the entire process enshrined under the Guidelines ensures that environmental risks are considered and management strategies to overcome any significant environmental issues such as ground water level decline, land subsidence are proposed and implemented.

A Copy of the “Guidelines to regulate and control ground water extraction in India” dated 24.09.2020 issued by the Ministry of Jal Shakti, Union of India are annexed herewith and marked as ***ANNEXURE R-8. (From Pg.988 to 1016)***

(vii) Further, the answering Respondent has already planned to take suitable measures for controlling basement backup and ensuring that there is no hindrance caused to the natural flow of ground water in the area. The following measures will be undertaken in this regard :-

a. The excavation is kept dry.

b. The basement design includes protection against ground water ingress to the finished development. Designs, to the satisfaction of the competent Authority, will afford sufficient protection in the event of ground water flooding.

c. The basement design includes ground water drainage systems/ French Drains to prevent ground water backing up around the development and thereby protect neighbouring properties from impact.

d. Footing drains, sloping away from the basement and discharging into recharge structures or land, as necessary, are also be provided with the concurrence of the competent authority, completely around the basement along with drains beneath the basement floor. The basement floor will rest on a bed of gravel, and the gravel will have perforated drain pipes laid in to prevent any water from accumulating beneath the basement floor. The drains will be perforated pipes, usually PVC or some other type of thermoplastic and laid on several inches of gravel at the base of the footings and covered by gravel. The gravel, being

much more permeable than the soils, allows water to rapidly drain into the perforated pipes and channelled away before it can even contact the basement wall.

e. Soil drains such as a French drain are installed, if necessary, to reduce the build-up of moisture in areas upstream of the basement.
f. All basement construction projects follow the requirements of the British standard BS 8102:2009 code of practice for the protection of below ground structures against water from the ground.
g. The Basement construction follows IS:3067(1988). Code of practice for general design details and preparatory work for damp proofing of building.
h. The basement construction follows IS:12251(1987). Code of practice for drainage of building basements.
i. The basement construction follows the guidelines given in IS 1742-1983 regarding disposal of Surface and subsoil waters.
j. All necessary conditions in the permissions for dewatering for basement construction are complied with.

In light of the above, it is submitted that the answering Respondent has taken adequate mitigating measures to ensure that there is no hindrance to the natural flow of ground water, affecting the hydrograph of the area.

In Re: Underestimation of water requirement for construction phase and operation phase [Paragraph 25(f)-(k)]

The contents of paragraph 25(f)-(k) are denied *in toto*.

ESTIMATION OF WATER DURING CONSTRUCTION PHASE

55. It is submitted that the answering Respondent is fully aware of the water requirements during the construction phase and further of the contents of the study entitled, *"Assessment of water resources consumption in building construction in India. S. Bardhan, Department of Architecture, Jadavpur, University, India, 2011."* A copy of the Paper titled *"Assessment of water resources consumption in building construction in India. S. Bardhan, Department of Architecture, Jadavpur, University, India, 2011* is annexed herewith and marked as ***ANNEXURE R-9 . (From Pg.1017 to 1025)***

56. As submitted before the sectoral EAC, during the construction phase, the water requirement for the project is estimated to be about 280 million litre @ 2kl/sqm of Built up Area ("**BUA**"), and will be met by treated water through tankers supplied by the Delhi Jal Board. ***(@ Pg. 70, Vol.I, Appeal)*** The Appellant however submits that the Project requires embodied water quantity of 27.6 KL per sq.m of built-up area.

57. The appellant is trying to mislead this Hon'ble tribunal by stating that the embodied water quantity of a multi-storied apartment is the amount of water to be used by the Project Proponents during the construction phase. It is submitted that embodied water quantity is different from the water required for construction.

58. Embodied water is generally regarded as the amount of water which goes into making something

(environmentvictoria.org.au/uploads2016/0677 embodied-water.pdf) and is defined as the amount of water required to manufacture products including extracting the raw materials, transporting those materials and processing them into final product. ***(Illustrated Dictionary of Architecture 2012. The MC Graw Hill companies).*** Embodied water therefore includes the water used in the manufacture of all raw materials required in the construction industry including water used in the production of cement and steel and other raw materials and is different from the water used in the premises for construction. This fact has been suitably established in the study referred to by the Appellant.

59. The 'Abstract' to the aforesaid study very clearly states that, "*This paper examines some of the issues related to the subject like water demand at material production as well as construction stage and the resultant embodied water of typical urban constructions in India which was found to be in the range of about 27 Kiloliters/sq.m. of total built up area."* This also establishes that embodied water includes water use in materials production and the actual water used in construction at site and is in fact the water foot print for construction projects. The said paper at page 99, para 4.4, Results and Discussion states that *"Inferring from the above calculations, the embodied water of the major building materials together works out to be 25.604 Kg/sq.m while the water consumed during the actual construction was 2KL/sq.m."*

60. Crucially, the said paper also indicates that the water consumption during the actual construction process was found to be only 8% of the total embodied water of the

materials together, which is the water consumption within the respective industries at the material production stage.

61. The said paper also tabulates a breakup of the 25.604 KL of embodied water which has been estimated above and the same is being reproduced from the paper.

Table-1: Assessment of Embodied water in the materials of the case study

S.No.	**Materials**	**Quantity used**	**Unit**	**EW Coefficient (KL/Unit)**	**Total embodied water in material (KL)**	**Embodied water per unit floor area. KL/Sq. M**
1	Cement	154,858	Ton	1	154858	0.5
2	Bricks	42849.37	Cum	0.71	30423	0.1
3	Steel	38906	Ton	200-250	7781200	25
4	Aluminium	15143	Kg	0.088	1332.584	0.004
					Total embodied water of major materials	25.604

62. In the present case, the water consumption during construction phase has been calculated as 2 Kl/sq. meters giving a total embodied content as 27.604 as mentioned in

the Appeal. As admitted by the appellant, the water quantity for construction has been estimated at the rate of 2KL/sq.m. which is in accordance to the observations made in the referred study. Therefore, there has been no underestimation of construction water requirement.

SOURCE OF TREATED WATER TO BE USED DURING CONSTRUCTION PHASE

63. Further, with respect to the source of the treated water to be used during the construction phase, it is humbly submitted that the EAC was informed that the water requirement of 280 million liters will be met by treated water from tankers. It is most humbly submitted that all permissions and clearances are to be taken only once the EC has been obtained and in line with the conditions of the Environmental Clearance.

64. The E.I.A. notification 2006 has provided at para 6 that, *"An application seeking prior environmental clearance in all cases shall be made in the prescribed Form 1 annexed herewith and Supplementary Form 1A, if applicable, as given in Appendix II, after the identification of prospective site(s) for the project and/or activities to which the application relates, before commencing any construction activity or preparation of land at site by the applicant."* The notification also states at para 8(v) that *"clearances from other regulatory bodies or authorities shall not be required prior to receipt of applications for prior environmental clearance of projects or activities, or screening, or scoping, or appraisal, or decision by the regulatory authority concerned, unless any of these is sequentially dependent on such clearance either due to a requirement of law, or for necessary technical reasons."*

65. The EC issued by the MoEF and CC in the present case directs at Specific Condition no. xviii ***(Pg 74, Vol.I, Appeal)*** that *"The Environmental Clearance to the project is primarily under the EIA notification, 2006. The Project proponent is under obligation to obtain approvals/clearances under any other Acts/Regulations or Statutes as applicable to the project."*

66. In compliance to the conditions of the EC, the Project Proponents have entered into an agreement for supply of treated water for construction purposes.

67. In view of the above, considering that the MoEF & CC has a right to refuse grant of clearance or amend the project through conditions, there was no necessity of seeking permissions and making agreements before filing the application. However, the Expert Appraisal Committee was informed of the proposal to source construction water from STP through Tankers to which it granted the necessary permission through Specific Condition no. (i) of the E.C. ***(Pg. 73, Vol.I, Appeal)*** directing the proponents that only treated waste water shall be used for construction purposes.

THE ANSWERING RESPONDENT WILL NOT USE GROUND WATER DURING THE CONSTRUCTION PHASE

68. The EC prescribes under Specific Conditions (xiii) ***(@ Pg. 73, Appeal, Vol.I)***that "***Project proponent shall obtain the necessary permission for dewatering of ground water from the Central Ground Water Authority (CGWA)"*** and under condition no. III (xiii), ***(@ Pg. 77, Appeal, Vol.I)*** Water Quality Monitoring and Preservation that "***No ground water shall be used during the construction phase of the project"***. The answering Respondent stands committed to

these two conditions which are self-explanatory. The Project Proponent will take necessary permission from the CGWA before dewatering and further it will not use the ground water in construction and will comply with any condition that the CGWA may impose in this regard.

69. In view of the conditions imposed in the EC that only treated water shall be used in the construction phase as also the condition that no ground water shall be used, the apprehension of the Appellants appear to be unfounded. As directed, no ground water shall be used and dewatered ground water shall be disposed as per the conditions of the permission as may be granted by the CGWA in this regard.

70. That the appellant is also misleading this Hon'ble Tribunal that the facts related to the use of treated water in construction phase and dewatering were not considered by the Expert appraisal committee and the MoEF & CC (Respondent No.1) while appraising the project. As is evident from details mentioned above it, both the EAC and the MoEF & CC(Respondent No.1) have diligently examined this issue and while permitting the use of STP treated water in constructions have prohibited the use of ground water in the construction phase.

ESTIMATION OF WATER DURING OPERATION PHASE

71. As stated in Form-I and submitted before the EAC, during the operation phase, water requirement for the Project will be met from the water supplied by the Delhi Jal Board (DJB). ***(@ Pg. 70, Appeal, Vol.I)*** The total quantity of water requirement for the Project is expected to be about 222 KLD, out of which 158 KLD of fresh water will be met by the supply of the DJB while

64 KLD will be recycled water, as treated in the *in situ* STP of the Project.

A Copy of the sanctioning letter of the DJB dated 05.06.2021 which is annexed herewith as ***ANNEXURE R-10. (From Pg1026. to 1039)***

72. In fact, in its 62nd Meeting held on 01.03.2021, the EAC had sought a clarification from the Appellant regarding the water balance chart while stating the following,***(@ Pg. 458, Appeal, Vol.III)***

> *"4. The EAC noted certain discrepancies in the Conceptual plan submitted by the PP regarding the disposal of treated water**. In the Conceptual plan, as per the section on Environmental Management Plan, the PP has proposed that entire treated sewage will be reused for toilet flushing and horticulture, while as per the water balance diagram and table on water requirement, it has been stated that about 96 KLD will be disposed in to municipal drain**."*

73. The answering Respondent furnished its Reply and corrected the aforementioned discrepancy. ***(@ Pg. 465-521 @ Pg. 488,Vol.III, Appeal)*** Therefore, it is clear that the EAC undertook a detailed and thorough assessment of the water requirement for the Project.

74. It is submitted that the answering Respondent has correctly assessed the water requirement, as per the applicable norms instituted by the MoEF & CC. The total water requirement for the Project is based upon the figures as provided in the *"Manual On Norms And Standards For Environment Clearance Of Large Construction Projects"* published by the MoEF & CC ("**the Manual**"). After computing the rate of consumption on the basis of the said statutory guidelines, it is clear that the requirement for water of 221.2~222 KLD is

adequate. The calculation regarding the adequacy of water is elaborately presented later.

75. The Appellant has erroneously argued that the water requirement has been under-estimated since the 2nd EC granted to the Appellant on 22.03.2018 provided for more water during the operation phase. The said contention is liable to be dismissed since earlier, the Project was planned to cater water requirement as per National Building Code ("**NBC**") norms of 135 liters per capita per day ("**lpcd**"). Further, during a hearing before the SEAC Delhi while the 2nd EC was being appraised, on 24.02.2018, the answering Respondents were asked to revise the figures and make them to conform to the Delhi Jal Board Guidelines. A figure of 200 lpcd was suggested by the Committee and a commitment sought during the meeting to make provisions accordingly. The answering Respondent thereafter submitted a letter on 09.03.2018 to the SEAC, upwardly revising the water use to 200 lpcd.

    A copy of the relevant pages of the letter dated 09.03.2018 submitted before the SEAC Delhi is attached herewith and marked as ***ANNEXURE R-11. (From Pg. 1040 to 1044)***

76. While applying for the present EC, the Project Proponents were advised on the need to minimize water consumption by recycle, harvesting and reuse. Thus, the Project has been conceptualized and designed with purpose of being environmentally friendly and focused on conservation of natural resources including the conservation and reuse of water. Conservation of water can be achieved by reduction of per capita consumption of water from 135 liters per capita per day to 86 liters per capita per day.

77. The answering Respondents were also advised to follow the water quantity norms as provided in the Manual published by the MoEF & CC. The said manual at para 2.3.1 list the various steps to be taken for water conservation within buildings.
A Copy of the relevant extracts of the Manual on norms and standards for environment clearance of Large Construction projects" published by the MoEF and CC is annexed herewith and marked as ***ANNEXURE R-12. (From Pg. 1045 to 1121)***

78. The Manual states at para 2.3.1.1 that as per BIS standards for residential buildings with a population of 20000-100000, the per capita consumption is 100-150 lpcd and for those with population above 100000, the consumption is 150-200 lpcd out of which 45 lpcd may be taken for flushing requirements and the remaining for other domestic purposes. It has also stated that for other buildings this may vary from 30 lpcd to 240 lpcd. The Manual has suggested measures to reduce this demand through the use of water saving devices, low flow flushing systems, sensor-based fixtures, automated flushing urinals, use of low flow faucets, use of low flow shower heads, use of tap aerators and other water efficient appliances. Dual pipe plumbing is also recommended for reuse of recycled water for flushing. The Manual has suggested that the water consumption can be brought down from 135 lpcd to 86 lpcd if suitable measures for recycle and reuse and low flow symptoms practiced.

Table 2.4 from the manual quantifying the reduction is being reproduced below for reference.

Table 2.4: Estimation of water use Reduction

Category	Consumption lpcd	Reduced Consumption (lpcd)	Reduction %

Human Consumption	7	7	Nil
Bathing	20	20	Nil
Flushing	45	21	53%
Washing	40	15	62%
Miscellaneous	23	23	Nil
Total	135	86	36%

79. In light with the Manual of the MoEF & CC, the Project has been designed to use low flow fixtures, low flush dual flushing systems in toilets, increasingly efficient irrigation of greens, reuse of water, dual pipe plumbing system and reuse and recycle of water and because of these conservation measures even through the population is rising, there is a substantial reduction in fresh water demand from earlier proposals.

80. The MoEF and CC has also stipulated necessary conditions in this regard in the EC [III. (vi), III.(vii) and III(viii)]which read as: ***(@ Pg. 76-77, Appeal, Vol.I)***

> *"vi. Installation of dual pipe plumbing for supplying fresh water for drinking, cooking and bathing etc and other for supply of recycled water for flushing, land scape, irrigation, car washing, thermal cooling, conditioning etc. shall be done.*
> *vii. Use of water saving devices/fixtures (viz. low flow flushing systems, use of low flow faucets, tap aerators etc.) for water conservation shall be incorporated in the building plan.*
> *viii. Separation of grey and black water should be done by the use of dual plumbing system. In case of single stack systems separate recirculation times for flushing by giving dual plumbing system be done. "*

81. The answering Respondents stand duty bound to comply with the conditions of E.C. as stipulated above on recycle, reuse and conservation of water. The EAC has been supplied with

realistic quantities of water to be used during the operation phase and there is no contradiction in this regards.

82. The Appellant has erroneously argued that the per capita water consumption translates to 96.4 liters per day per person. As is evident from Table 2.4 above, the MoEF takes into consideration 86 lpcd as the reduced water consumption for residential purposes and includes water for human consumption, bathing, Flushing, washing and miscellaneous in calculating this. A part from this there are water requirements for visitors, non-residential population, swimming pool water make up and also landscape water requirement. The water consumption details as submitted before the Expert Appraisal Committee is as follows.

WATER REQUIREMENT				
Purpose	**Population/Area**	**Rate of consumption**	**Quantity, kld**	**Source**
Residential				
Domestic	2302 heads	65 lpcd	150	Fresh (DJB supply)
Flushing	2302 heads	21 lpcd	49	Recycled Water
Non-Residential				
Domestic	30 heads	25 lpcd	0.75	Fresh (DJB supply)
Flushing	30 heads	20 lpcd	0.6	Recycled Water
Visitors				
Domestic	230 heads	5 lpcd	1.15	Fresh (DJB supply)
Flushing	230 heads	10 lpcd	2.3	Recycled Water
Swimming Pool Water Makeup	270 sqm	20 mm/sqm loss	5.4	Fresh (DJB supply)

Landscape Water requirement	6113 sqm	2 l/sqm	12	Recycled Water
Total Water Requirement			221.2~222 kld	

The water consumption details as already given are as follows.

1	Domestic and Flushing (Residential, 2302 Heads)	199 KLD	@86 lpcd
2	Domestic and Flushing (Non residential) 30 Heads	1.35 KLD	@25 lpcd domestic and 20 lpcd flushing
3	Domestic and Flushing (Visitors) 230 Heads	3.45 KLD	@5 lpcd domestic and 10 lpcd flushing
4	Swimming Pool make up	5.4 KLD	
5	Land scape requirement	12 KLD	
	Total	222 KLD	

83. The per capita water requirement for residential purposes has been proposed at 199 KLD for 2302 people which is 86 lpcd as prescribed by the MoEF & CC in its Manual and is not 96.4 liters per person per day. The balance 23 KLD is water for non-residents, visitors, swimming pool and landscape. Therefore, there is this no contradiction in the details submitted in form 1 before the E.A.C. and with reference to which the MoEF & CC granted the subject EC.

84. The Appellant has placed reliance on Delhi Government's Water policy for Delhi (2016). However, the estimates provided in the said Water Policy are supply norms and demand projections in Delhi and not applicable to a construction project. A major part of any urban agglomeration with assorted dwelling units may be limited in its ability to

provide conservation measures that can be provided in a building and construction project which are stronger and more organized, by virtue of the scale of operation, in providing for such conservation measures and reducing water consumption.

85. The Appellant has further argued that in case the DJB is not able to meet the water requirement, the answering Respondent would turn to ground water for meeting any deficit. The said argument is completely wrong and contrary to the express undertaking of the Appellant that it will not use any groundwater during the construction or operation phase. The same is incorporated by way of a special condition in the EC, i.e. Specific Condition (i).***(@ Pg. 73, Vol.I, Appeal)***

86. Further, as per Specific Condition No. (iii) in the EC, continuous online monitoring system shall be installed in the STP for data for quality and quantity of water. Thus, there is mechanism for constant scrutiny of the water being consumed in the Project. ***(@ Pg. 73, Vol.I, Appeal)***

87. Lastly, as per the Standard Conditions (III) related to water quality monitoring and preservation, the following safeguards must be met by the answering Respondent, ***(@ Pg. 76-77, Vol.I, Appeal)*** "

    (i) *The natural drain system should be maintained for ensuring unrestricted flow of water.* ***No construction shall be allowed to obstruct the natural drainage through the site, on wetland and water bodies****. Check dams, bio-swales, landscape, and other sustainable urban drainage systems (SUDS) are allowed for maintaining the drainage pattern and to harvest rain water.*

    (ii) *Buildings should be designed to follow the natural topography, as much as possible. Minimum cutting and filling should be done.*

(iii) *The quantity of fresh water usage, water recycling and rainwater harvesting shall be measures to protect the water balance as projected by the Project Proponent. The record shall be submitted to the Regional Office, MoEF&CC along with six monthly Monitoring reports.*

(iv) *A certificate shall be obtained from the local body supplying water, specifying the total annual water availability with the local authority, the quantity of water already committed, the quantity of water allotted to the project under consideration and the balance water available. This should be specified separately for ground water and surface water sources, ensuring that there is no impact on other users.*

(v) *At least 20% of the open spaces as required by the local building bye- laws shall be pervious. Use of Grass pavers, paver blocks with at least 50% opening, landscape etc. would be considered as pervious surface.*

(vi) *Installation of dual pipe plumbing for supplying fresh water for drinking, cooking and bathing etc and other for supply of recycled water for flushing, landscape irrigation, car washing, thermal cooling, conditioning etc. shall be done.*

(vii) ***Use of water saving devices/ fixtures (viz. low flow flushing systems; use of low flow faucets tap aerators etc) for water conservation shall be incorporated in the building plan.***

(viii) *Separation of grey and black water should be done by the use of dual plumbing system. In case of single stack system separate recirculation lines for flushing by giving dual plumbing system be done.*

(ix) *Water demand during construction should be reduced by use of pre- mixed concrete, curing agents and other best practices referred.*

(x) ***Rain water harvesting recharge pits/ storage tanks shall be provided for ground water recharging as per the CGWB norms.***

(xi) *A rain water harvesting plan needs to be designed where the recharge bores of minimum one recharge bore per 5,000 square meters of built up area and storage capacity of minimum one day of total fresh water requirement shall be provided. In areas where ground water recharge is not feasible, the rain water should be harvested and stored for reuse. The ground water shall not be withdrawn without approval from the Competent Authority.*

(xii) *All recharge should be limited to shallow aquifer.*

(xiii) ***No ground water shall be used during construction***

phase of the project.

(xiv) ***Any ground water dewatering should be properly managed and shall conform to the approvals and the guidelines of the CGWA in the matter. Formal approval shall be taken from the CGWA for any ground water abstraction or dewatering.***

(xv) *The quantity of fresh water usage, water recycling and rainwater harvesting shall be measured and recorded to monitor the water balance as projected by the project proponent. The record shall be submitted to the Regional Office, MoEF&CC along with six monthly Monitoring reports.*

(xvi) *Sewage shall be treated in the STP with tertiary treatment.*

(xvii) *No sewage or untreated effluent water would be discharged through storm water drains.*

(xviii) *Onsite sewage treatment of capacity of treating 100% waste water to be installed. The installation of the Sewage Treatment Plant (STP) shall be certified by an independent expert and a report in this regard shall be submitted to the Ministry before the project is commissioned for operation. Treated waste water shall be reused on site for landscape, flushing, cooling tower, and other end-uses. Excess treated water shall be discharged as per statutory norms notified by Ministry of Environment, Forest and Climate Change. Natural treatment systems shall be promoted.*

(xix) *Periodical monitoring of water quality of treated sewage shall be conducted. Necessary measures should be made to mitigate the odour problem from STP.*

(xx) *Sludge from the onsite sewage treatment, including septic tanks, shall be collected, conveyed and disposed as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organization (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013."*

In Re: EC was granted despite no clarity provided by the Project Proponent on the use of ground water. [Paragraph 25k]

88. The contents of paragraph 25(k) are vehemently denied. It is clarified that the answering Respondent will not be using any ground water. During the dewatering process for basement

construction, the sub soil water level is to be lowered through abstraction. The answering Respondent does not intend to use the abstracted ground water for any purposes, such as during the construction or operation phase. Further, the answering Respondent will comply with any direction issued by the CGWA *qua* the disposal of the abstracted water.

89. In any case, it is submitted that the process of dewatering for basement construction cannot be equated to the use of ground water.

In Re: OM dated 23.05.2019 not followed for considering the issue of groundwater extraction involved in the project [Paragraph 25 (l)]

90. The contents of paragraph 25(l) are denied since the said OM is wholly inapplicable in view of the fact that the answering Respondent is not using ground water for the Project.

In Re: The status of area with regards to scarcity of Groundwater and its effect on Northern Ridge not considered [Paragraph 25 (m)]

91. The contents of paragraph 25(m) are denied. It is reiterated that the present Project, does not intend to use any ground water and therefore, there is no question of exacerbating pressure on the groundwater in the area or its detrimental impact to the vegetation in the Northern Ridge or the Campus of the Appellant. In any case, the Ridge is located at a distance of 500 mtrs from the Project.

In Re:Carrying Capacity study of the area with regards to available water resource not done as per the direction of this Hon'ble Tribunal [Paragraph 25 (n)]

92. The contents of paragraph 25(n) are denied. It is submitted that the Committee as appointed by this Hon'ble Tribunal in Appeal No. 112 of 2018 had carried out a detailed carrying capacity assessment and rendered specific findings *qua* the availability of water. The relevant findings are stated hereinbelow,

> *"It is understood that no ground water will be extracted during construction & occupancy phase of the project. The water requirement during construction will be met through private tankers and during occupancy by Delhi Jal Board for which necessary permission have been obtained. Further, 0.003% increase in water requirement in the grid is anticipated.[…]*
> *Water Demand and Solid waste: An increase of 0.003% (of water demand in the grid) in the freshwater requirement, 0.002% in discharge of treated sewage into the municipal sewer, an increase of 1.27% in solid waste generation from the current generation in the grid was considered nominal."*

In Re: The Site in question falls under sub-zone C-13 (University Area) where tall buildings area restricted under MPD 2021 and Zonal Development Plan of Zone C [Paragraph 25(o) to (r)]

In Re: 'Unseemly' buildings such as the proposed project are restricted in the area and consultation with Appellant has been mandated for consideration of such project which was not done[Paragraph 25(s)]

93. The contents of paragraph 25(o)-(s) are denied. It is submitted that the above contentions were raised before the Hon'ble High Court of Delhi in WP (C) No. 2743 of 2012 and have been categorically rejected *vide* a detailed Order dated 27.04.2015. That the said Order has been upheld by the Hon'ble Supreme Court *vide* Order dated 17.12.2019. Having attained finality, it is submitted that the said contentions cannot be raised in the present proceedings. In addition, it must be pointed out that the said contentions do not relate to the environment and are beyond the scope of the enactments mentioned in Schedule I of the NGT Act, 2010 and are thus

beyond the jurisdiction of this Hon'ble Tribunal, as provided for in Section(s) 14-16 of the said Act.

94. In this regard the answering Respondent would rely on its submissions in paragraph 26 to 32 of the present Reply Affidavit.

In Re: Traffic Analysis Observations of this Hon'ble Tribunal's Committee selectively relied ignoring its objection and observation of the Hon'ble Tribunal in the final order dated 20.01.2021. [Paragraph 25(t)]

95. The Answering Respondent vehemently denies the averments made in Paragraph No. 25(t) of the Appeal. Pertinently, the evaluation made by Prof. Geetam Tiwari in January 2020 was based on a Traffic Survey prepared by the answering Respondent in 2011, and does not take into consideration the assessments carried out by the answering Respondent thereafter, specifically the Traffic Survey conducted by the Answering Respondent in 2018.***(@ Pg. 633-655, Vol. III, Appeal)*** Further, it is pertinent to note that it is this 2018 Report that was taken into consideration by the EAC while evaluating the grant of the present EC, alongside the Traffic Impact Assessment carried out by the Committee appointed by this Hon'ble Tribunal.

96. It is pertinent to note that the objections raised by the Appellant to the Committee were recorded, including the Appellant's main points of disagreement, being *inter alia* the width of the surrounding roads (Chhatra Marg and Cavalry Lane) being contrary to the data submitted by the Answering Respondent, and that atleast 900 vehicles will be added to

the current load, causing appreciable increase in vehicular pollution in the area.

97. It is humbly submitted that the application of mind of the Expert Committee is clear insofar as the Committee has estimated that the number of cars owned by the residents of the Project shall be 410 x 2, and in its expert opinion, it has considered that the daily usage on average shall be of 1.5 cars, therefore, the daily traffic load will increase by 615 cars. On the contrary, Prof. Geetam Tiwari's report is based on an estimated traffic of 320 Passenger Car Units ("**PCU**"), and suggested that since the Project is for High Income Group ("**HIG**") residents, the daily usage shall be of 2 cars, therefore, increasing the traffic load by 640 cars. However, the Committee, after considering both reports and in its expert opinion, came to the above-said conclusion of 1.5 cars per day per household. It is humbly submitted that the limitations of conducting a merit review of the assumptions, basis and findings of the EAC have been laid out by the answering Respondent in detail in the foregoing paragraphs of this Reply, more specifically in the Preliminary Submissions, and are not being repeated herein for the sake of brevity.

98. Pertinently, the Appellant has also not disclosed the specific finding in the 2018 Survey, which *inter alia* concludes that a substantial proportion of personal trips will be made by the Delhi Metro, especially due to the Project's nearness to the Vishwavidyalaya Metro Station, being at walking distance. Further, the Appellant has not disclosed the finding that the existing volume by capacity ratio ("**v/c ratio**") shall increase from 0.56 (considering a local, two – lane, two – way carriageway) to 0.857 as per the Indian Roads Congress Report No. 106 ("**IRC 106**"). The Report, therefore, concluded

that an estimated v/c ratio of 0.85 would not create congested conditions on Cavalry Lane.

99. Further, the due application of mind of the EAC is borne out from the fact that the following specific conditions have been placed upon the Answering Respondent through the EC dated 21.05.2021 that is under challenge:

    a. Specific Condition No. A(x) (@ ***Pg. 74 of the Appeal Paperbook***) – "*A detailed traffic management and traffic decongestion plan shall be drawn and implemented to ensure that the service of the roads near project site may not get adversely impacted after the implementation of the project. The plan should stipulate inter-alia the path and appropriate time for the movement of vehicles to and from site. The plan shall be vetted by the concerned agency in the state Government*"

    b. Specific Condition No. B(VIII)(iii) (@ ***Pg. 80 of the Appeal Paperbook***) – "*A detailed Traffic management and traffic decongestion plan shall be drawn up to ensure that the current level of service of the roads within 05 Kms radius of the project is maintained and improved upon after the implementation of the project. This plan should be based on cumulative impact of all development and increased habitation being carried out or proposed to be carried out by the project or other agencies in this 05 Km radius of the site in different scenarios of space and time and the traffic management plan shall be duly validated and certified by the State Urban Development Department and the PWD/competent authority for road augmentation and shall also have their consent to the implementation of components of the plan which involve the participation of these departments*"

In Re: The width of two approach roads of the site in question is narrower than what is considered during grant of EC [Paragraph 25(u)]

100. The Appellant has incorrectly alleged that the width of the approach roads to the Project is narrower than considered by

the EAC during grant of the EC under challenge. As per the Layout Plan dt. 18.09.2020, as approved by the North MCD, i.e. the municipal authority, the width of Cavalry Road is 24mtrs and that of Chhatra Marg is 18mtrs. The Committee constituted by this Hon'ble Tribunal has suggested an acceptable level of service even during peak traffic hours.

A copy of the Layout Plan issued by the North MCD on 18.09.2020 as well as the Layout Plan for the University of Delhi are annexed herewith and marked as ***ANNEXURE-R-13.(Colly) (From Pg. 1122 to 1125)***

101. Further, with respect to the discrepancy in traffic count alleged by the Appellant herein (@ ***Pg. 39, Appeal, Vol.I***), it is pertinent to note that as per Engineering Principles, the capacity of a road is calculated by the Formula – "C = 1,000 x V / S", where C is the Capacity, V is the Speed and S is the centre-to-centre spacing between vehicles. Therefore, the formulated/theoretical capacity of a road is not a function of its length or width, but inf act of the speed of the vehicles and the spacing between them, being directly proportionate to the speed and inversely proportionate to the spacing, meaning thereby that faster average speed would increase the capacity and higher spacing would reduce the capacity.

102. Therefore, for Chhatra Marg, the average speed being 22 kmph, and a centre-to-centre spacing of 9.07m, the formula works out to "C = 1000 x 22 / 9.07" which is equal to 2425.57, rounded off to 2426. For Cavalry Marg, the average speed is 22.5 kmph and the spacing is 9.17m, therefore, the capacity is "C = 1000 x 22.5/9.17" which comes out to 2453.65, rounded off to 2454. Therefore, there is no basis for the Appellant to suggest any discrepancy in the data, and the

allegation is being made by the Appellant merely to mislead this Hon'ble Tribunal.

In Re: Chhatra Marg is an accident prone area and impact of the project on increasing the risk especially for disable community using these roads will increase [Paragraph 25(v)]

103. The contents of Paragraph 25(v) are denied. At the outset, it is humbly submitted that this contention has already been considered by the Hon'ble High Court of Delhi and the Hon'ble Apex Court, and dismissed *vide* judgments dated 27.04.2015, 29.01.2018 and 17.12.2019, respectively, meaning thereby that this issue has been put to rest and cannot be raised again before this Hon'ble Tribunal. However, even otherwise, the Appellant's contention has no basis in merit, as has been described in detail herein below.

104. The contentions raised by the Appellant herein have already been considered by the EAC, which was acknowledged by the EAC at its 64th Meeting, specifically at Paragraph No. 2(iv) – where it notes that the point-wise reply has been submitted to the Appellant's contentions on 02.03.2021 (@ ***Page 543, Vol.III, Appeal***). The EAC also accorded its satisfaction to the replies given by the Answering Respondent at Paragraph no. 4 of the said Minutes.

105. Further, the following action plan has been given by the answering Respondent:

> "*The Supreme Court Committee studied the impact of additional cars on roads during the occupancy phase of the project on Chaatra Marg, Vishwavidyalaya to Vidhan Sabha Road, Vidhan Sabha to Vishwa Vidyalaya, G.C. Narang Road and Cavalry Road and a traffic count*

undertaken by the CPCB on 12-10-2020. The Supreme Court Committee has noted that 'Based on analysis, it is inferred that the inclusion of 615 passenger cars on the road from the project will result in marginal increase in volume to capacity ratio (range in from 0.04 to 0.16). For the various sections of the roads, it is also observed that increase in volume to capacity ratio during the moving peak hours (0.04 to 0.16) and evening peak hours (0.05-0.08) is less, as compared to the ratio during the afternoon time (0.09- 0.016). The Supreme Court committee has only suggested a marginal degradation and an acceptable level of service even during peak traffic hours. Further the proximity to the metro station will reduce the use of personal vehicles. In order to further improve the traffic situation, the project proponents would:

A. If this Honourable Committee feels so, coordinate with the local authorities to catalyse the widening of the Cavalry Road and the Chaatra Marg to their designed capacities. Both roads are wide but not being currently used as per their desired width.

B. Ensure that no vehicles are parked outside the project premises.

C. Allow app-based taxis/other pick-up fixed time dedicated parking slots with in campus/access to client to prevent waiting outside premises.

D. Evolve an incentive-based system of subsidizing residents and encouraging them to use Public mode of Transport. Develop an exclusive network for Green Modes or NMT (non- motorized transit system) to enhance multi-modal connectivity to the metro station entry and exit points. The envisaged loop is anticipated as one-way loop in anti-clockwise direction without any right turning movement. This green route will be interfaced with external road network system and will include Pedestrians, Pedal Cycles and environment friendly state-of-the art para transit technology. This will ensure Walk and ride to work/nodal point through exclusive routes for pedestrians (and cycles), public / para transit modes."

106. Further, the Specific Condition No. B(VIII)(iii) (@ ***Pg. 80, Vol.I, Appeal***) in the EC under challenge specifically sets out the creation of a traffic management plan to prevent such issues in the locality of the Project.

107. In view of the above, it is not apposite for the Appellant to state that its contentions given on 02.03.2021 have not been taken into consideration, and the allegation is, therefore, baseless.

In Re: Traffic Analysis Report of 2018 was relied on by the EAC while Granting EC in the Year 2021 and conflicting data on successive Traffic Analysis Report [Paragraph 25(w)-(x)]

In Re: Objection of the Appellant to the observations made under the Committee Report dated 10.12.2020 with regards to traffic analysis relied upon by Ms/ YBPL not considered [Paragraph 25(y)-(cc)]

108. The contentions raised by the Appellant in Paragraph No. 25(w)-(cc) of the Appeal are denied as being misleading, and ought to be dismissed by this Hon'ble Tribunal, as the Appellant is merely trying to confuse the Hon'ble Tribunal. Pertinently, the 2011 Survey Report is now irrelevant, as the MoEF & CC only permits baseline data that is less than three (3) years old, during appraisal of an Environmental Clearance.

109. During the appraisal itself, the EACs application of mind is borne out from the following observation (***Paragraph No. 1(x) @ Pg. 456, Vol.III, Appeal***) – "*Parking facility of 860 is proposed to be provided against a requirement of 858 ECS (according to Local norms).*" Therefore, the 2011 Report has not been considered either by the Answering Respondent, the Committee constituted by this Hon'ble Tribunal, or the EAC during appraisal of the EC under challenge.

110. Further, the EAC has taken cognizance of the 2020 Expert Committee Report (Rapid Indicative Environmental Impact Assessment) dated 10.12.2020. The Committee based its assessment on an Equivalent Car Space ("**ECS**") of 854, as per norms (including visitor parking), and the usage of 615 cars daily (410 households x 1.5 cars used per day). (@ ***Pg. 271, 272, Vol.II, Appeal***).

111. Pertinently, neither the Committee constituted by this Hon'ble Tribunal, nor the EAC, have based their assessment/appraisal on a PCU of 320, as incorrectly alleged by the Appellants herein.

112. It is pertinent to note that the Appellant herein has given a bald allegation against the answering Respondent in relation to parking space or capacity of the Project, however, has not studied the relevant provisions of the Master Plan of Delhi or the National Building Code, on the basis of which the answering Respondent has provided the numbers in the subject EC.

COMPARISON OF POPULATION BETWEEN THE 2018 EC AND THE SUBJECT EC

113. It is pertinent to note that, in 2018, the answering Respondent applied for an EC for 1,785 persons, as per the population norms laid out in the MPD-2021. In the answering Respondent's 2018 EC, the Project provided for 258 residential apartments and 152 units of housing for the Economically Weaker Section ("**EWS**") population ***(@ Internal Pg. 86, Conceptual Plan for 2018 EC)***. The MPD norms provide that the EC ought to be for 4.5 persons, on average, in a residential apartment, and 2.5 persons, on average, in an EWS apartment. The same is based on the

MoUD Norms set out in its notification dated 13.05.2013, as per which the Density (Upper Limit) is set at 900 persons per hectare or 200 Dwelling Units per Hectare, therefore, setting the limit at 900 persons per hectare automatically. Pertinently, the Appellant University itself follows the norm for 900PPH, therefore, cannot now deny that the answering Respondent is following the same Norms. Accordingly, the 2018 EC provided for the following Population Break-Up:

S. No.	Category	No. of Units	Persons Per Unit	Total
1.	Residential Apartment	258	4.5	1,161
2.	EWS Apartment	152	2.5	380
3.	Staff		@5% of Residential Population	58
4.	Visitors		@10% of Residential Population	116
5.	Shops	15	2	30
6.	Community	1	40	40
			TOTAL	1,785

A Copy of the relevant extracts of the Application for the 2018 EC is annexed herewith and marked as ***ANNEXURE R-14. (From Pg. 1126 to 1145)***

114. With respect to the present EC, the answering Respondent has applied for an EC for 2,302 persons, as per the norms for population set out in the National Building Code, 2016 ("**NBC, 2016**"). In the EC under challenge, the answering

Respondent has also changed the break-up of the dwelling units, as compared to the 2018 EC. Pertinently, in the subject EC, the answering Respondent's project provides for 222 apartments and 224 units for the EWS population. In contrast to the MPD-2021 population norms, as set out in the previous paragraph, the NBC 2016 provides that, for each 1-bedroom dwelling unit, there shall be a population requirement of 4 persons, for each 3 bedroom dwelling unit, the requirement shall be of 6 persons, and for each 4 bedroom dwelling unit, the requirement shall be of 7 persons. Thus, the norms prescribed under the NBC are higher than the MPD-2021 which has led to the increase in the number of persons in the subject EC. Therefore, the subject EC has provided for the following population break-up:

S. No.	Category	No. of Units	Persons Per Unit	Total
RESIDENTIAL APARTMENTS				
1.	4 – Bedroom Dwelling Unit	74	7	518
2.	3 – Bedroom Dwelling Unit	148	6	888
EWS APARTMENTS				
3.	1 – Bedroom Dwelling Unit	224	4	896
			TOTAL	2,302

115. Accordingly, the above showcases the difference in the Population Break-Up of the answering Respondent's Project. It is submitted that the project provides for resources and space upto 2302 persons, in compliance with NBC norms.

Further, it is crucial to note that under prevailing conditions of nuclear families, the number of persons in the household would be lesser than the estimated upper limit that has been set out in the NBC norms. For instance, NBC provides for a population of 7 persons in a 4-bedroom apartment, however, most nuclear families contain 4 persons at an average.

CRITERIA FOR PARKING

116. The Appellant has failed to bring to this Hon'ble Tribunal's notice that, as per the norms of the Ministry of Urban Development ("**MoUD**"), the criteria for parking provisions is on the basis of area, and not on the basis of number of residents. As per the MOUD Notification dated 23.09.2013, which is also subsumed fully in MPD-2021, specifically Table 17.2 at Section 8(4) in Chapter 17, the Permissible Minimum Parking for Residential Apartments is 2 ECS/100m^2 of floor area. Further, as per clause 4.4.3(B) of the MPD-2021, the Permissible Parking for EWS Apartments is 0.5 ECS/100m^2 of floor area. Therefore, the parking provision in the subject EC is on this basis, and not the basis of population that is residing at the Project, which is an irrelevant correlation attempted to be drawn by the Appellant.

117. In the Subject EC, the answering Respondent's project covers 40,500m^2 FAR for Residential Apartments, and 9,478 m^2 FAR for EWS Apartments. Therefore, the breakup of the parking requirement has now been set as:

S. No.	Category	FAR	ECS/100m^2	Total
1.	Residential Apartment	40,500	2	810

2.	EWS Apartment	9,478	0.5	48 (47.39)
			TOTAL	858

118. Against the above requirement, the following parking has been provided in the Project (***Ann. A/13 – Pg. 345*** @ ***Pg. 399/400, Vol.II, Appeal***):

S. No.	**Parking Provided**	**ECS**
1.	Podium 1 (Single Car Parks)	101
2.	Podium 1 (Stack Car Parks)	124
3.	Podium 1 (Accessible Car Parks)	10
4.	Podium 2 (Single Car Parks)	56
5.	Podium 2 (Stack Car Parks)	190
6.	Stilt Above Podium 2 (Stack Car Parks)	12
7.	Upper Basement (Single Car Parks)	174
8.	Upper Basement (Accessible Car Parks)	13
9.	Lower Basement (Single Car Parks)	180
	TOTAL	860

119. Therefore, the MPD Norms *qua* Parking requirements as stated hereinabove have duly been met by the answering Respondent.

120. Pertinently, the additional parking is adequate to cover the additional persons that will be added to the project as per the MPD Norms, as has been set out hereinbelow:

S. No.	Category	No. of Units	Persons Per Unit	Total	Parking Provided
2018 EC					
1.	Residential Apartment	258	4.5	1,161	854
2.	EWS Apartment	152	2.5	380	
			TOTAL	1,541	
2021 EC					
3.	Residential Apartment	222	4.5	999	860
4.	EWS Apartment	224	2.5	560	
			TOTAL	1,559	

Pertinently, for the additional 18 persons, an additional 6 ECS have been provided. Further, it is submitted that the MPD-2021 norms are statutory in nature and are uniformly followed while granting ECs, including the subject EC.

121. With respect to the observations made by this Hon'ble Tribunal *vide* order dated 20.01.2021, the same was done by the Hon'ble Tribunal to note the contentions and responses of every party, but came with the following observations at Paragraph Nos. 13 and 14:

> "*13. In view of the stand of the parties, it is no longer necessary for this Tribunal to go into the merits and express any final view about the viability of the project or otherwise.*"
>
> "*14. Accordingly , the appeal is disposed of as infructuous, without prejudice to the rights of the remedies of the parties in accordance to Law.*"

122. Therefore, the observations of the Hon'ble Tribunal in the said order were not findings of the Hon'ble Tribunal on the merits of the matter, and thus, ought not to be taken into consideration. The Appellant has exercised its remedy in law by raising objections before the EAC, and the EAC has considered them during its appraisal.

123. Notwithstanding the above, the Order dated 20.01.2021 has been examined by the EAC in its 62nd Meeting (***Paragraph No. 3 of Minutes @ Pg. 458, Vol.III, Appeal***), and the Appellant's contentions and Answering Respondent's replies have also been considered by the EAC in its 64th Meeting (***Paragraph No. 4 of Minutes @ Pg. 543, Vol.III, Appeal***).

124. Further, the Committee constituted by this Hon'ble Tribunal in Appeal No. 112 of 2018, was set up to carry out the Environmental Impact Assessment and examine the viability of the Project, and therefore, there is no impediment in using the data generated by this Committee, either by the Answering Respondent or by the EAC of the MoEF & CC.

125. This Committee of renowned experts has based its assessment on a movement of 615 PCU on the roads which has been extensively described in the report and is self-explanatory and as per norms. In doing so they have also rightly assumed that all cars are BS-IV compliant or based on CNG. It is humbly submitted that that BS-IV compliant engines were made mandatory from 2010. The ARAI-TERI, 2018 Report relied upon by the Committee (@ ***Page 21 of the Report, Pg. 273, Vol.II,Appeal***) states that the BS-IV engines do not generate Particulate Matter. It is pertinent to note that BS-IV is a standard for automobile engines which also includes diesel engines. As per BS-IV norms, which are

mandatory across the country since April 2017, the pollutants from petrol-powered passenger vehicles were restricted to a Carbon Monoxide emission of 1.0 g/km, Hydro carbons+Nitrogen Oxides discharge of 0.18 g/km, and Respirable suspended particulate matter discharge of 0.025. The diesel models emitted a peak carbon monoxide of 0.50 g/km, a nitrous oxide of 0.25 g/km, and Hydro carbons+Nitrogen Oxides discharge of 0.30 g/km. Also, the Sulphur content in the Bharat Stage IV-compliant fuels was restricted to 50 PPM. Therefore, it is incorrect to state that BS-IV norms do not account for diesel vehicles and it is also wrong to challenge the veracity of the Report of the Expert Committee on this basis.

A Copy of the Notification dated 19.08.2015 introducing BS-IV norms is annexed herewith and marked as ***ANNEXURE R-15. (From Pg.1146 to 1149)***

A Copy of the Emission Standards Booklet issued by ARAI is annexed herewith and marked as ***ANNEXURE R-16.***

(From Pg. 1150 to1 211)

126. In fact, the data used in the 2020 Expert Committee Report is from 2016, wherein most of the vehicles were complying to norms prior to BS-IV norms, wherein the emission was higher. Furthermore, from 01.04.2020, the Central Government has mandated that vehicle makers must manufacture, sell and register only BS-VI (BS6) vehicles, which are even more environmentally friendly. The Project is for high income group and if construction is commenced as on date, the operational phase will happen after 4 years, i.e., 2025, and the cars used will be with latest technology registered after 2010 or 2020 (not prior to 2010 as cars after

15years are banned in Delhi) which, if not BS VI, will be at-least, BS IV compliant.

In Re: The project in question cannot be allowed without assessing the carrying capacity of the area especially considering that the AAQ of the area is beyond the prescribed national standards [Paragraph 25(dd)]

127. The contents of paragraph 25(dd) are denied. It is submitted that the answering Respondent commissioned a fresh ambient air quality assessment study before filing the Application for grant of EC and the same was submitted to the EAC along with its Application for EC. ***(@ Pg. 441, Vol. II, Appeal)*** The said study was conducted by an NABL accredited and MoEF & CC recognised laboratory. The following findings were noted based on the data of the said study,

> *"The background ambient air quality at the project site was observed that SO2, NO2 and CO concentrations are within the prescribed limit. The PM10 and PM 2.5 exceeding the permissible limit.*
>
> *PM10: The concentration of PM10 was found ranging between 155.00 µg/m to 376.00 µg/m .*
> *The 98th percentile value of PM10 was found to be 374.46 µg/m3 and average value of PM10 is 297.00 µg/m3 during the month of December 2020. The background PM10 is well above the permissible limit. It is found generally that the PM10 level in the region of Delhi and NCR is more than the permissible limit and also maximum during the month of December and January. One of the important reasons for high level of PM10 is due to the burning of Paralli (agricultural left over in the field) in the region of Punjab and Haryana. However, in some years the concentration of PM10 is even higher than what is observed in this year.*
>
> *PM 2.5: The concentration of PM2.5 was found ranging between 87.00 µg/m to 195.00 µg/m .*

The 98th percentile value of PM2.5 was found to be 194.16 µg/m3 and average value of PM2.5 is 155.38 µg/m3 during the month of December 2020. The background PM10 is well above the permissible limit. It is found generally that the PM10 level in the region of Delhi and NCR is more than the permissible limit and also maximum during the month of December and January. One of the important reasons for high level of PM10 is due to the burning of Paralli (agricultural left over in the field) in the region of Punjab and Haryana. However, in some years the concentration of PM10 is even higher than what is observed in this year.

SO2: The concentration of SO2 was found ranging between 8.9 µg/m to 12.2 µg/m . The 98th percentile value of SO2 was found to be 12.12 µg/m3 and average value of SO2 is 10.43 µg/m3 during the month of December 2020. The background level of SO2 is found to be well within the permissible limit. The main source of SO2 is due to vehicular movement as the project site is adjacent to Mall Road.

NO2: The concentration of NO2 was found ranging between 22.8 µg/m to 38.4 µg/m . The 98th percentile value of NO2 was found to be 38.15 µg/m3 and average value of NO2 is 30.35 µg/m3 during the month of December 2020. The background level of NO2 is found to be well within the permissible limit. The main source of NO2 is due to vehicular movement as the project site is adjacent to Mall Road.

CO: The concentration of CO was found ranging between 1.18 mg/m to 1.36 mg/m . The 98th percentile value of CO was found to be 1.36 mg/m3 and average value of CO is 1.29 mg/m3 during the month of December 2020. The background level of CO is found to be well within the permissible limit. The main source of CO is due to vehicular movement as the project site is adjacent to Mall Road."

It was thus found that the level of CO, No2 and So2 were well within prescribed limits whereas PM 2.5 and PM 10 were higher due to stubble burning in neighboring states of Delhi, since the study was undertaken in December.

128. It is further submitted that the Committee appointed by this Hon'ble Tribunal also undertook a detailed study with respect to the carrying capacity of the area, with a focus on air pollution. It was concluded in the 2020 Expert Committee Report that there will be a marginal and statistically insignificant increase in Air Pollution Levels. The Committee looked at the figures from the nearest ambient air quality station to the project site at North Campus. The annual average concentration for the years 2018 and 2019 for SO2, NO2, NH3, Benzene, PM2.5, PM10 and CO was analysed and it is noted that while NO2 was within stipulated norms, PM2.5 and PM10 were exceeding standards during 2018 and 2019. It was stated in the Report that, ***(@ Pg. 273, Vol.II, Appeal)***

> *"INFERENCE*
>
> *Being a high-income group residential project, the likely source of air pollution is vehicular emissions from estimated additional 615 cars on road during occupancy phase. During assessment, it was assumed that these additional cars would be BS IV compliant and driven by petrol or CNG. The applicable emission limits for CO, HC and NOx were used to estimate additional pollution load. The BS IV 4 wheelers do not generate particulate matter and thus no likely addition to existing PM levels is expected.*
>
> *Further, the annual pollution load data from ARAI-TERI, 2018 study for Delhi was used to estimate additional pollution load in Timarpur ward due to additional 615 cars on road due to proposed project, using area as proportionating factor.* ***Statistically insignificant increment is noted in CO (0.25%), HC (0.09%) and NOx (0.1%) emissions due to proposed project."***

129. Thus, the Appellant cannot argue that there is no data with respect to the carrying capacity of the area, with respect to

the ambient air quality. In fact, two scientific studies have been conducted *qua* the air quality of the vicinity.

130. It is further submitted that while appraising the Project in its 62nd Meeting, the EAC also sought information from the answering Respondent herein with respect to the *"Air pollution management in the context of Graded Action Plan for Delhi & NCR."* ***(@ Pg. 459,Vol.III, Appeal)*** The said information was submitted by the answering Respondent on 22.03.2021 wherein the answering Respondent put forth the Air Pollution Management Plan in terms of Graded Action Plan for Delhi & NCR as per Ministry of Environment, Forest and Climate Change Notification (G.S.R. 94) dated 25.01.2018. Therefore, the EAC has also closely monitored the air pollution in the area while granting the subject EC.

A Copy of the Air pollution management in the context of Graded Action Plan for Delhi & NCR submitted by the answering Respondent before the EAC is annexed herewith and marked as ***ANNEXURE R-17. (From Pg. 1212 to 1217)***

131. The Appellant is relying on the Order of this Hon'ble Tribunal in ***Utkarsh Panwar Vs CPCB & Ors.*** (O.A. No. 1016/2019) which relates to the closure of all Brick Units in NCR Region till the carrying capacity assessment is done for the area. The said Order has no relevance to the present case, which is a one-time construction project and not a polluting industry akin to a brick kiln. In fact, this very distinction was highlighted by the Hon'ble Supreme Court in ***Central Vista Case (Supra)*** wherein it was held that,

> "***514. In the present case, the subject project is an independent building and construction project wherein one-time construction activity is to be carried out. It is not a perpetual or continuous activity like a running industry. It is absolutely incomprehensible to***

accept that a project of this nature would be unsustainable with the needs and aspirations of future generations.*[….]."*

In Re: Impact of dust pollution will affect nearby Hospital and science labs [Paragraph 25(ee)]

132. The contents of paragraph 25(ee) are denied. During the construction phase, any disturbance through dust pollution will be mitigated by use of wind breakers all along the project boundary, compact storage of loose soil and C&D wastes and water sprinkling on roads and vulnerable areas of the construction site will be carried out for dust suppression. Further, Specific Condition (iii) in the EC provides that, *"Ready-mix concrete shall be used to the larger extent to minimize dust emissions at site."*

133. It is further submitted that the Vallabhbhai Patel Chest Institute is located at an aerial distance of 460 mtrs. Thus, there is no basis to show that dust would travel for such a long distance. ***(Map @ Pg. 378, Vol.II, Appeal)*** In any case, the answering Respondent will carry out sufficient mitigating measures for dust suppression. That further, the Appellant has mentioned "various science laboratories" without specifying any location which would be at threat by dust.

In Re: Area in question not considered to be a silence zone even through the said area is an education hub [Paragraph 25(ff)]

134. The contents of paragraph 25(ff) are denied. It is submitted that the Government of NCT of Delhi (Department of Environment) through its notification F.12(1)N.P/Env/2005/32 dated 03.04.2008 ***(@ Pg. 668, Vol. IV, Appeal)*** has declared the following areas as "Silence Areas/Zones" for the purpose

of the noise Rules, in the National Capital Territory of Delhi, namely:-

a. An area of 100 meters around all Educational Institutions having more than one thousand students;

b. An area of 100 meters around all Courts;

c. An area of 100 meters around all Government Office Complexes;

4. An area of 100 meters around all 100-bedded and above hospitals.

A Copy of the Map showing distance between the Project and areas such as the Ridge and Patel Chest Institute, as well as other construction projects, is annexed herewith and marked as ***ANNEXURE R-18. (From Pg. 1218)***

135. The said distance criterion is prescribed under the *aegis* of the Noise Pollution (Regulation and Control) Rules, 2000, and specifically thereunder wherein it is provided that,

> *"**3. Ambient air quality standards in respect of noise for different areas/zones. [….]***
>
> *(2) The State Government shall categorize the areas into industrial, commercial, residential or silence areas/zones for the purpose of implementation of noise standards for different areas. [….]*
>
> *(5) An area comprising not less than 100 metres around hospitals, educational institutions and courts may be declared (by the State Government)14 as silence area/zone for the purpose of these rules. [….]*
>
> *Provided that, an area shall not fall under silence area or zone category, unless notified by the State Government in accordance with sub-rule(2)."*

Further, the schedule to the Noise Pollution (Regulation and Control) Rules, 2000 prescribes the decibel levels to be adhered to in various zones, at different times of the day.

136. It is submitted that the present Project does not fall under a "Silence Zone" since no educational institutions having more than 1000 students, no courts, no government office complexes and no hospitals with more than 100 beds are present within 100 m of the project site. The nearest hospital to project site is Patel Chest Hospital, which is located at an aerial distance of 460 mtrs and thus silence zone standards are not applicable. The project does not fall in a silence zone. Further, the Notification dt. 03.04.2008 clearly specifies that the Silence Zone of 100 mtrs. is restricted to "Educational Institutions" having more than 1,000 students. It would be farcical for the Appellant to argue that the statutory "Silence Zone" comprises 100 mtrs. around any building of the Appellant University, even though it may not be used for educational purposes and may not house 1000 students.

137. The Appellant has mentioned that the Faculty of Education, University of Delhi, would be at a "throwaway distance" without specifying the actual distance from the site. In fact, the said institution is over 200 mtrs away from the project site and is therefore not covered by the Notification dated 03.04.2008.

A Copy of the Google map image showing the distance between the Project and the Faculty of Education is annexed herewith and marked as ***ANNEXURE R-19. (From Pg. 1219)***

138. In any case and without prejudice to the above, it is submitted that there are particular of standards of noise by decibel level, which are prescribed for noise emissions in silence zones and it is not the case that construction activity is altogether prohibited in Silence Zones. Thus, in the case of Silence Zones, noise activity is merely regulated and not barred

completely. The said standards are mentioned in the Schedule to the Noise Pollution (Regulation and Control) Rules, 2000.

139. Further, as per the 2020 Expert Committee Report appointed by this Hon'ble Tribunal in Appeal No. 112 of 2018, it was observed that, ***(Pg. 278, Vol.II, Appeal)***

> *"As it is a group housing project, miniscule impact on noise environment during occupancy phase is anticipated, except during intermittent operation of the DG sets as backup power"*

140. It is erroneous to argue that the impact of noise pollution has not been considered by the EAC inasmuch as the answering Respondent has furnished a Report on Ambient Noise in the area based on samples from 5.12.2020-6.12.2020, along with its Application. As per the said data, the noise in the region is within the permissible limits for a residential area with a minor violation from 10-11 AM [55.4 db(A) as opposed to 55], 14:00-15:00 PM [55.7 db(A) as opposed to 55 db(A)] . Thea abovenoted figures have been placed before the EAC and are compliant with the standards of emission prescribed for residential areas udner the Noise Pollution (Regulation and Control) Rules, 2000. ***(@Pg. 439-440, Vol.II, Appeal)***

141. It is submitted that the most modern and technologically adept mitigation measures will be provided in the Project to minimize any noise. For instance, during the construction phase of the Project only intermittent operation of back up DG set will be required, which will be done with the following mitigating safeguards,

. All the DG sets will be as per the E (P) Rules and noise level from the DG sets will be as per the prevailing standards.

- DG sets will be installed in the DG room to minimize the impact on ambient noise.
- DG room will be provided with acoustic lining/ treatment to insure 25 dB (A) insertion loss as per the regulations.

- Adequate exhaust mufflers will be provided as per norms to limit the noise.
- The DG sets will be built in damper for anti-vibration.
- The DG sets will be used during event of power failure only.

142. Further, the EC granted for the Project requires the following conditions to be followed regarding noise emission,

> **Specific Condition No. xi *(Pg. 74, Vol.I, Appeal)*** *- Noise barriers of adequate efficiency shall be provided during construction phase.*
> **Standard Condition (B) (II) *(Pg. 76, Vol.I, Appeal)*** *– x. The diesel generator sets to be used during construction phase shall be low sulphur diesel type and shall conform to Environmental (Protection) prescribed for air and noise emission standards.*
> *xi. The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution. Low sulphur diesel shall be used. The location of the DG set and exhaust pipe height shall be as per the provisions of the Central Pollution Control Board (CPCB) norms.*
> **Standard Condition (B)(IV) *(Pg. 78, Vol.I, Appeal)*** *- (i) Ambient noise levels shall conform to residential area/commercial area/industrial area/silence zone both during day and night as per Noise Pollution (Control and Regulation) Rules, 2000. Incremental pollution loads on the ambient air and noise quality shall be closely monitored during construction phase. Adequate measures shall be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB / SPCB.*
> *(ii) Noise level survey shall be carried as per the prescribed guidelines and report in this regard shall be submitted to*

Regional Officer of the Ministry as a part of six-monthly compliance report.
(iii) Acoustic enclosures for DG sets, noise barriers for ground-run bays, ear plugs for operating personnel shall be implemented as mitigation measures for noise impact due to ground sources.
Standard Condition (B)(VIII)(ii) ***(Pg. 80, Vol.I, Appeal)*** **-** *Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to applicable air and noise emission standards be operated only during non-peak hours.*

In Re: Fire Safety of the project cannot be ensured as the fire department do not have requisite equipment to deal with fire in high construction in narrow roads [Paragraph 25(gg)]

The contents of paragraph 25(gg) are denied. It is submitted that the said contention has absolutely no merit. On 12.07.2021, the Delhi Fire Service has accorded fresh approval for the Project. This was a detailed approval, wherein several conditions have been laid down, showing complete application of mind. These conditions include the provision of a clear cut 9mtrs wide with 12 mtrs radius turning motorable road for free movement of fire tender in line with clause 8.2 of the UBBL,2016, while also specifying the number, width, type and arrangement of exits, captive water storage for fire-fighting, the provision one staircase as a “Fire Tower” in each block as per clause 9.3.13 of UBBL-2016 etc. As per the Building Plan for the Project, Tower/Block A-C have 2 Fire Check Floors and the EWS Building has 1 Fire Check Floor. Further, a fire detection system and sprinkler system are also provided. In addition, the Fire Approval of DFS specifically notes that the same is being issued in accordance with the NBC, 2016, Part-4.

A Copy of the Approval dated 12.07.2021 issued by the Delhi Fire Service is annexed herewith and marked as ***ANNEXURE R-20. (From Pg.1220 to 1224)***

143. Thus, the DFS, which is the issuing authority has closely scrutinized the Project and thereafter granted its approval.

144. On an earlier occasion, the DFS had rejected the Application for Fire Clearance for the Project due to certain shortcomings in the Plan proposed by the answering Respondents. It is only after the short comings were corrected that the DFS granted its approval. This shows clear and thorough application of mind on behalf of the DFS which cannot be faulted with by the Appellant, in the absence of concrete and specific evidence.

A Copy of the Rejection letter issued by the DFS dated 04.06.2021 is annexed herewith and marked as ***ANNEXURE R-21. (From Pg.1225).***

145. The Appellant has relied on the case ***of Vikas Singh v. Lt. Governor and Others – W.P.(C) 1476/2014***(Order dated 20 January 2016) to argue that the DFS has no equipment to deal tall buildings. In the case of ***Vikas Singh (Supra)*** the Hon'ble High Court was considering an amendment to the MPD-2021 *vide* Notification dated 23rd September, 2013 by way of which, maximum height of the building was prescribed as 15 meters in plot without stilt parking and 17.5 meters in plot with stilt parking and which further provided that such buildings were not to be considered as high rise buildings "for the purpose of fire and life safety requirements, clearance of Fire Department will be obtained by the individual plot owner". It is submitted that in said Judgment, the submission of the DDA was recorded wherein it was stated that *"the Fire*

Department does not have adequate number of fire-fighting equipment/vehicles for building above 15 meters height, if no setbacks are available in those plots;"

It is submitted that the said contention is completely inapplicable to the facts of the present case. Firstly, setback is available in the present project. In the present case, and further in the case of buildings with height of over 15 mtrs, an NOC from the Fire Department is needed and fire department ensures that the building is capable of handling fire with various provisions like complete fire detection system, sprinkler systems, Fire check floors, Fire towers etc. Such a clearance has admittedly been obtained in the present case. Further, in ***Vikas Singh (Supra),*** the Hon'ble High Court was admittedly dealing with plotted houses located in residential colonies with narrow roads which is clear from the following,

> *"We are also satisfied with the explanation rendered by the Chief Fire Officer who had appeared before us, of the near impossibility of fighting fires in houses of such height, situated in residential colonies internal roads whereof do not even permit a fire brigade to reach the houses and the resultant need to fight accidents of fire therein with manual ladders. We cannot, for the sake of letter of law, expose the citizenry of Delhi who will occupy the said houses with increased height, to the hazards of fire."*

In the present case, not only has the DFS given its approval, keeping in mind the width of roads leading to the project, but even the Building Plan has been sanctioned by the North Delhi Municipal Corporation on 23.07.2021. In addition, set-back is available in the present case. Further, the Project is not located inside a congested residential colony. In fact, in ***Vikas Singh(Supra)***, the Hon'ble High Court stressed on the

importance of sanction accorded by the municipal authority to a building plan and observed that,

> *"We say so because the Supreme Court in N.D.M.C. Vs. Statesman Ltd. AIR 1990 SC 383 has held while clearance by Chief Fire Office is an indispensable condition for eligibility of sanction, such clearance by itself is neither conclusive nor binding on the Municipal Authority and is not a limitation on the Municipal Authority to satisfy itself that the building plans provide for adequate fire safety precaution in accordance with bye- laws or in a better measure. Applying such ratio, we are of the view that if the petitioner satisfies the SDMC that the construction of his house/building is otherwise in consonance with the sanctioned plans and the petitioner has taken sufficient measures for fire safety and/or takes such further measures to notwithstanding the increased height make his house/building fire safe, the construction does not remain unauthorized"*

***In Re: No consideration given on the impact of the project on Northern Ridge** [Paragraph 25(hh)]*

146. The contents of paragraph 25(hh) are denied. The Project is not located in the Northern Ridge, and is 500 mtrs away from the Northern Ridge. There is no legal restriction on the existence of a Project 500 mtrs. away from the ridge. The Hon'ble Supreme Court in ***DDA v. Kenneth Builders*** reported at ***(2016) 13 SCC 561***, held that the approval of the Ridge Management Board is sought when the Project Site falls in the Ridge area or area which is morphologically similar to and adjacent to the Northern Ridge. The Project site of the Respondent No.2 falls beyond 0.5 Km from the Northern Ridge and has no tangible or direct impact, environmental or otherwise, on the Northern Ridge area in North Delhi and neither is it being constructed on land morphologically similar to the Northern Ridge.

In Re: KS Rao's Report with regards to seismicity of the area not given due attention to [Paragraph 25(ii)-(jj)]

147. The contentions being raised by the Appellant in Paragraph 25(ii)-(jj) are vague and hence denied. As per macro seismic zoning map of India, the Bureau of Indian Standards has classified the entire country into 4 major groups – Zone V (high intensity) to Zone II (low intensity). Zone IV and V refer to severe and very severe categories respectively. Admittedly, most of the areas in Delhi and NCR fall under seismic zone IV as per Indian Standard Seismic Zoning Map, which is of high Seismic risk. The said fact has also been detailed out in at Serial No. 8.3 of the Form I. The National Building Code and IS codes in this context prescribe various guidelines for safety against earthquakes and tremors. Accordingly, the buildings in the present Project will be designed as per the said guidelines so as to safely resist all loading as applicable to Seismic Zone 4. The seismic stability of the proposed 41 storeyed building has been taken into consideration during the project assessment and the structural stability certificates have been verified.

148. It is submitted that *vide* online application/proposal No. IA/DL/MIS/ 197084/2021 dated 15.02.2021, the Answering Respondent had applied for grant of EC the MoEF for the project in question. Vide its Representation dated 02.03.2021 the Appellant had raised various issues in respect of the Project, including that the issue of Seismic parameter. The proposal has been discussed and appraised by the Expert Appraisal Committee in its 62nd meeting held on 01.03.2021 along with the said representation filed by the Appellant herein. Admittedly, in its 62nd meeting the EAC sought a response from the Answering Respondent to the said representation made by the Appellant, apart from seeking response on few other queries. The Answering Respondent

vide its response dated 22.03.2021 provided a detailed response to the various issues raised by the EAC as well as the representation made by the Appellant.

149. A bare perusal of the said response by the Answering Respondent shows that the Answering Respondent ***(@ Appl. for EC - Pg. 480, Vol.II Appeal, Response @ Pg.536, Vol.III, Appeal)*** has detailed out the various mitigation measures along with the other compliances which is proposed to be undertaken by the Answering Respondent. The Answering Respondent has stated that the design of the buildings would be made to mitigate the seismic impacts. It has further stated that the building structure would be designed strictly in compliance with all the applicable BIS codes, especially the following:

    a. IS – 456:2002 (Design of Reinforced Concrete Structures)
    b. IS – 1893:2016 (Criteria for Earthquake Resistant Design Structures)
    c. IS – 1670:2017 (Criteria for structural Safety of Tall Concrete Buildings)

    Apart from the said compliances, the Answering Respondent also stated that Wind Tunnel studies specific to the building and its surroundings would be conducted to arrive at the actual wind loads. Further, the slenderness ratio and the maximum seismic drift will be maintained at levels below the maximum values of 8.0 and 0.40 respectively. It is further submitted that the Building Plan of the Project was sanctioned, having due regard to the provisions of Chapter-9 of the Unified Building Bye Laws, 2016 ("**UBBL, 2016**") which prescribes stringent measures to be followed towards Structural Safety. Rule 9.2.1

mandates that during the evaluation of a structure, the structural engineer must assess the seismic strength of the structure. The Building Plan dated 23.07.2021 was admittedly sanctioned, taking into account the above norms enshrined in the UBBL, 2016.

A Copy of the Building Plan dated 23.07.2021 is annexed herewith and marked as ***ANNEXURE R-22.***

(From Pg. 1226 to 1229)

A Copy of the presentations made by the answering Respondent dated 01.03.2021 and 13.04.2021 are annexed herewith and marked as ***ANNEXURE R-23 (Colly) .(From Pg.1230 to1 323)***

150. The said response by the Answering Respondent was duly considered and discussed over by the EAC in its 64th meeting held between 12th – 13th April 2021, and after due deliberations it was observed that the response/ clarifications submitted by the Answering Respondent to the various queries raised by the EAC were found to be satisfactory. The EAC after detailed deliberations, during the 64th meeting, recommended the project for grant of Environment Clearance with specific and general conditions. It was only after the due satisfaction of all the responses and clarifications provided that the EAC decided to recommend the grant of the EC to the project. However, the said grant of the EC was subject to various conditions.

151. Subsequently, as a matter of fact, even while granting the EC for the project to the Answering Respondent, the MoEF deliberated upon the various issues raised and only proceeded to grant the EC subject to various stringent conditions, especially with regard to the Seismic impact on

the proposed project. A bare perusal of the EC shows that specific condition being condition no. (ii) under Standard Conditions – Statutory Compliances whereby the answering Respondent is obligated to obtain requisite approvals from the Competent Authorities in respect of structural safety of the buildings due to earthquakes etc. ***(@Pg. 74, Vol.I, Appeal)***

152. It is further imperative to mention here that the Appellant has placed reliance on the purported one-page opinion of Mr.KS Rao, which is only a single page opinion in general pertaining to Delhi as whole. On the other hand, the answering Respondent is relying upon the report of another former IIT professor and ex-Director, Prof. V S Raju, the 2009/2011 Report of M/s Rao Engineering (an environmental expert) as well as the 2018 Soil Analysis done by M/s Ground Engineering Ltd. (an environmental expert), which are site-specific Reports relating to the subject Project and which discuss in detail the impact on soil, structure and seismic zone as well as the liquefaction potential.

In Re: The Soil Investigation Report of 2018 cannot be applied to the present project in question where the capacity has increased [Paragraph 25(kk)]

153. The contents of Para 25(kk) of the Appeal are incorrect, misconceived and hence emphatically denied, especially the averments that the Answering Respondent submitted the soil Investigation report by M/s Ground Engineering Ltd. of 2018. The Appellant is making frivolous averments which are contradictory to the facts and even the documents placed on record by the Appellant itself. A bare perusal of the response to Clause 1.4 in the Appendix II to Form I - Clause 1.4 @**Page 384 of the Appeal** read with the **Test Report** annexed

thereto @ **Page 433 of the Appeal** clearly shows that the samples of the soil for carrying out the soil analysis were collected from the project site on 21.12.2020 by M/s Ind Research & Development House Pvt. Ltd. (MoEF&CC recognized and NABL Accredited Laboratory). Thus, it is baseless to allege that the Answering Respondent relied on an old report for obtaining the present EC or the various ground water table figures given in the said report prepared in the year 2018 for the grant of previous EC. The Appellant is only seeking to create prejudice in the mind of the Hon'ble Tribunal by making such frivolous averments.

154. The soil analysis done for the proposed Project which has increased in size and height clearly shows that there would be no adverse impact of the said increased size and height of the project on either the surroundings or the soil. As stated above, admittedly the project site falls within Zone IV as per Indian Standard Seismic Zoning Map, which is of high Seismic risk. the buildings in the present Project will be designed as per the said guidelines so as to safely resist all loading as applicable to Seismic Zone 4. The same is also reflected in the Appendix II to Form -I filled up by the Answering Respondent herein, which reads as under:- ***(@ Pg. 385, Vol.II, Appeal)***

"*<u>Seismicity</u>*
The area under study falls in Zone-IV (according to the Indian Standard Seismic Zoning Map), which is of high seismic risk. Therefore, suitable design will be made to mitigate the seismic impacts. The area of the study area falls in Zone-IV according to the Indian Standard Seismic Zoning Map), which is of high seismic risk. Therefore, suitable design will be made to mitigate the seismic impacts. The building structure will be designed to strictly comply with all applicable BIS codes especially the following: IS-456:2002 (Design of Reinforced Concrete Structures); IS – 1893:2016 (Criteria for Earthquake

Resistant Design Structures); IS – 1670:2017 (Criteria for structural Safety of Tall Concrete Buildings). Wind Tunnel studies specific to the building and its surroundings will be conducted to arrive at the actual wind loads. The slenderness ratio and the maximum seismic drift will be maintained at levels below the maximum values of 8.0 and 0.40 respectively."

It can thus be seen that the there is not even an iota of evidence placed on record by the Appellant to show that the proposed project with increased size and height would not be a feasible option at the project site. The Appellant is only making contradictory averments as opposed to the contents of the documents placed on record, without proving anything to the contrary.

155. It is further vehemently denied that the project is subject to liquefaction and hence not viable. The Appellant is yet again making bald averments without substantiating/corroborating the same. The Soil Report based on analysis of the samples collected from the project site on 21.12.2020 by Ind Research & Development House Pvt. Ltd. (MoEF&CC recognized and NABL Accredited Laboratory) is a well-reasoned and detailed report, which also looks into the aspect of liquefaction also. There is no linkage between ground water table and liquefaction. Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. The soil report of 2020 by Ind Research & Development House Pvt. Ltd. clearly shows that the pH of the soil is 8.40, water

holding capacity is 19.2%, Calcium 1776 mg/kg, organic matter 0.57 % by mass, CEC is 13.9 meq/100 gm, available nitrogen is 34.0 mg/kg, available phosphorus is 7.2 mg/kg, iron is 1190 mg/kg, copper 17.2 mg/kg and zinc is 31.5 mg/kg., thereby making the soil in the area fit for the project and not causing any threat either to the project or the areas in the vicinity of the project. Further, there has been no other construction on the Project site nor has any specific change pointed out by the Appellant which shows that there has been any change in the nature of soil in the project area that would have adversely impacted the nature of the soil in the project area. Thus all the allegations being levelled by the Appellant are baseless and are liable to be dismissed.

In Re: No consideration given to the fact that the area may be within Critically Polluted Area and is atleast in close proximity with Critically Polluted Area(s) [Paragraph 25(ll)]

156. The contents of Para 25(ll) of the Appeal are incorrect, misrepresented and hence denied. It is most respectfully submitted that the project site area is not located in the Critically Polluted Area and the same has also been observed by the EAC in its 62nd meeting held on 01.03.2021 (**Refer Page 465 of the Appeal**) as also in the EC under challenge at Para 4(xiii) [**Refer Page 71 of Appeal**]. The EAC reached the said conclusion after due deliberation and after taking into consideration all the relevant information regarding the same.

157. A bare perusal of S. No. (III) 11 of Form I, ***(@Pg. 368-369, Vol.II, Appeal)*** which seeks information regarding "*areas already subjected to pollution or environmental damage (those where existing legal environmental standards are exceeded)*", shows that in response to the same the

Answering Respondent has categorically stated Najafgarh Drain Basin being critically polluted. It is pertinent to mention here that the term “Najafgarh Drain Basin” includes Anand Parbat, Wazirpur Industrial Area, Naraina and Okhla. Reference in this regard may be made to the Office Memorandums dated 13.01.2020 and 15.03.2010. Accordingly, it cannot be said that the Answering Respondent has deliberately concealed about the Wazirpur Industrial Area by not mentioning about it in the Form-I. The Najafgarh drain is flowing at a distance of 0.45 Kms from the project site and the same has been duly stated in Form I. A perusal of the response by the Answering Respondent to S. No. (III) 11 of Form I shows that the Answering Respondent has categorically stated that the no effluent from the project site will be disposed in the Najafgarh Drain and that the treated effluent shall be partially used within the project site and balance will disposed in DJS STP through DJS sewer. There has thus been no concealment by the Answering Respondent.

158. It is submitted here that the proposed site for the project does not fall within the critically polluted area and accordingly, there is no finding or explanation about the same in the committee report. It is vehemently denied that the EAC has simply concluded on the submission made by Project Proponent that they are not within CPA ignoring the facts. The project area, which lies within the Delhi University, is not a critically polluted area and the said fact can be ascertained from a bare perusal of the various OMs mentioned by the Appellant. The Appellant is only making bald averments without substantiating the same. It is submitted that OM No. J-11013/5/2010-IA.II(I) dated 13.02.2010 read with OM No.

J-11013/5/2010 -IA II(I) dated 15.03.2010 issued by the MoEF details out the list of the polluted industrial clusters, wherein the Najafgarh drain basin (including Anand Parvat, Naraina, Okhla and Wazirpur), Delhi appears at S. No.11. It can thus be safely concluded that the project site area does not fall withing the 'critically polluted area', as is being alleged.

159. The non- application of the provisions of the various OMs issued under the EIA Notification, 2006, mentioned and relied upon by the Appellant is also denied being bald and misconceived. The Appellant has failed miserably to show as how the said OMs have any relevance with the project and how non-consideration of the same will have any adversely impact. It is pertinent to mention here that most of the OMs, as being referred to by the Appellant, have no relevance or applicability to the project of the Answering Respondent. The various OMs being relied upon by the Appellant are as follows:

i. **OM dated 25.08.2009** – The said memorandum deals with the proposals for environmental clearance for the projects located in critically polluted areas as identified by the Central Pollution Control Board. As stated above, the project area does not fall under the critically polluted area and thus the said memorandum is not applicable to the present case.

ii. OM dated 13.01.2010 – The said memorandum deal with consideration of EC based on Comprehensive Environmental Pollution Index. Perusal of the said memorandum shows that it has been categorically stated therein that in Central Pollution Control Board (CPCB) In association with Indian Institute of Technology (IIT), New

Delhi have, recently, carried out an environmental assessment of Industrial dusters across the country based on Comprehensive Environmental Pollution Index (CEPI) with the aim of Identifying polluted Industrial dusters and prioritizing planning needs for Intervention to Improve the quality of environment in the said industrial dusters and the nation as a whole. In all 88 industrial dusters have been assessed. A bare perusal of the said list clarifies that the project area does not fall within either the critically polluted area or the severely polluted area. Only Najafgarh drain basin (including Anand Parvat, Naraina, Okhla and Wazirpur), in Delhi features in the list. Accordingly, the restrictions imposed therein would not be applicable to the project in question.

iii. **OM dated 15.03.2010** – The said memorandum was issued only as further clarification of the OM dated 13.01.2010 regarding temporary moratorium. The said memorandum has no relevance to the facts of the present case.

iv. **OM dated 28.04.2011 –** The said memorandum was issued for consideration of the projects in the critically polluted areas. The said memorandum clarified that the projects to be located within 10 kms. from the latest list of the critically polluted areas as identified by the Central Pollution Control Board would attract the General Condition of EIA Notification, 2006 and therefore, such projects would need to be treated as category 'A' projects.

v. **OM dated 24.05.2011** – The said memorandum was issued in continuation of the Om dated 28.04.2011

clarifying that the building and construction sector projects, item 8(a) and township and area development projects, 8(b) of the EIA Notification, 2006 do not attract the general conditions and accordingly, the building and construction projects and township and area development projects would continue to remain as category 'B' irrespective of their location with respect to the critically polluted area. The said memorandum has not been relied upon by the Appellant, showing its malafide intentions and act of concealing facts.

vi. **OM dated 12.06.2019 –** The said memorandum is also not applicable and would have no relevance to the facts of the present case as the same deals with guidelines and additional safeguards for the projects in the critically polluted area and as stated above the project area in question does not fall under the critically polluted area.

vii. **OM dated 24.10.2019** – The said memorandum is also not applicable to the facts of the present case as the same deals with environment management of critically and severally polluted areas and the project area in question does not fall under either of the said areas.

viii. **OM dated 31.10.2019** – The said memorandum again deals with formulation of a mechanism for environment management of critically and severally polluted areas. The same is not applicable to the facts of the present case as the project area in question does not fall under either of the said areas.

ix. **OM dated 30.12.2019** - The said memorandum was issued in furtherance to the memorandum dated 31.10.2019 and is not applicable to the facts of the present case.

It can thus be seen that the Appellant is only seeking to mislead this Hon'ble Tribunal by presenting the facts in a distorted manner placing reliance on memorandums which have no significance or relevance and which are not even applicable to the facts of the present case.

In Re: No heed given to the privacy of women student residing in adjacent areas [Paragraph 25(mm)]

160. It is further submitted that the issue raised in the present appeal in para (mm) with respect to the privacy of women students residing in the adjacent areas is being raised in a vague and lacks any specific allegation and hence is denied. As a matter of fact, the Appellant has failed to specifically mention/point out not any women Hostel adjacent to or within even 100 mtrs. radius around the Project Site or as to how the present project would cause any problems or invade the privacy of the said women hostels. The Appellant is only making vague, baseless and frivolous averments without corroborating the same.

161. The *mala fide* conduct of the Appellant University is apparent from the fact that several issues, which have been settled by the Hon'ble Delhi High Court and the Hon'ble Apex Court, and have attained finality, have been raised by the Appellant yet again in the captioned Appeal. The privacy of the women students and women hostel being in the vicinity of the project herein being one of the said such issues. Not only have these issues been adjudicated and decided upon, but further, it is

humbly submitted, that these issues do not even tangentially touch upon the environment and thus are outside the jurisdiction of this Hon'ble Tribunal.

162. It is submitted that even the last round of litigation where the earlier 2nd EC granted to the Answering respondent was challenged by the Appellant, the issue of privacy of women hostel was raised and dealt with. In W.P. (C) No. 2743 of 2012 ***Registrar, University of Delhi v. Union of India,*** filed by the Appellant herein thereby challenging the decision by the DDA allowing the Answering Respondent herein to construct a high-rise multi-storey group housing society. The Appellant University made baseless allegations against the legality of the Project, as a result of which Lt. Governor of Delhi, in a meeting of the DDA dated 17.02.2010, constituted a Committee comprising of the Chief Town Planner, MCD, Engineer Member, DDA and the Chief Engineer, DMRC as members, to survey the entire area and examine the implications on the proposed high-rise buildings, on the privacy and integrity of the environment at the University of Delhi. A Joint Inspection was conducted by the that a Joint Inspection was conducted, which highlighted the following point with respect to the girls/women hostel:

> ….
> (v) *The proposed high-rise property development on 2.0 Ha. plot will not affect the privacy of the girls' hostel nearby, as these are either at a distance (e.g. Miranda House) or interspersed by other buildings (Meghdoot Hostel).*

163. The Hon'ble High Court, dealt with the said report filed by the Lt. Governor of Delhi and vide its final order/judgment dated 27.04.2015, passed in the W.P. (C) No. 2743 of 2012 was pleased to observe as follows:

> *"51. Thereafter, the matter was considered in DDA"s meeting held on 17.02.2010, whereby the Lt. Governor constituted a Committee under the Chairmanship of Engineer Member, DDA with Chief Town Planner, MCD and Chief Engineer, DMRC as members to survey the entire area and examine the implications on the proposed high-rise buildings on the privacy and integrity of the Delhi University environment. Accordingly, the Lt. Governor directed that the Committed would give its report within a week. Pursuant to the said direction, a joint inspection of the site was conducted by the committee members on 19.02.2010 whereby observed and concluded that the proposed high rise property development on 2.0 Hectare plot* ***will not affect the privacy of the girls' hostel nearby****, will not add to any parking problem and will also not affect the serenity / tranquillity of University area."*

164. On 25.01.2019, the Appellant herein filed SLP(C) No. 5581-5582 of 2019 before the Hon'ble Supreme Court, against the Order dated 29.10.2018 passed by the Hon'ble High Court of Delhi in LPA No. 89 of 2018 (wherein the order dated 27.04.2015 passed in WP(C) 2743 of 2012 was challenged by the Appellant herein). Before the Hon'ble Supreme Court also the Appellant vociferously raised the issue of privacy of the nearby girls' hostels. In fact, an application for intervention was filed also by the Delhi University Women's Association and by Students of Miranda House and other hostels.

165. Vide judgment dated 17.12.2019, the Hon'ble Supreme Court dismissed the above SLP(C) No. 5581-5582 of 2019, upheld the Orders of the Hon'ble High Court dated 27.04.2015 and 29.10.2018**.** The Hon'ble Apex Court took note of each and every contention raised by the Appellant and resultantly held that,

> *"31. In the matter of condonation of delay and laches, the well-accepted position is also that the accrued right of the opposite party cannot be lightly*

dealt with. In that regard, rather than taking note of the hardship that would be caused to Respondent 13 as contended by the learned Senior Counsel, what is necessary to be taken note of is the manner in which Respondent 11, DMRC has proceeded in the matter. Respondent 11, DMRC is engaged in providing the public transport and for the said purpose the Government through policy decision has granted approval to generate resources through property development and in that regard the development as earlier indicated, is taken up. Pursuant thereto Respondent 11 has received a sum of Rs 218.20 crores from Respondent 13 as far back as in the year 2008. The said amount as indicated is used for its projects providing metro rail service to the commuting public. ***In such circumstance, if at this stage the inordinate delay is condoned unmindful of the lackadaisical manner in which the appellant has proceeded in the matter, it would also be contrary to public interest.***

33. Accordingly, the appeals being devoid of merits stand dismissed with no order as to costs. All pending applications shall stand disposed of."

166. Resultantly, the Order of the Ld. Single Judge dated 27.04.2015 was upheld and stood merged with the Order of the Hon'ble Apex Court. Therefore, each of the allegations related to parking, height restrictions, privacy of hostels, violation of MPD-2021 etc. attained finality. Accordingly, the said issues cannot be raised again by the Appellant in the present appeal.

In Re: Facts have been concealed under Form I by Project Proponent [Paragraph 25(nn)]

167. The contents of para (nn) of the Appeal are incorrect, baseless and hence denied. It is submitted that the said allegations raised by the Appellant have no substance and are vehemently denied. There has been an honest and full disclosure of information known to the Project Proponent

when Form 1 was submitted. The facts of the present case do not reveal any deliberate concealment of fact/information from the EAC or supply of any misinformation. It is specifically submitted that in the present case, there is no deliberate concealment and/or submission of false or misleading information material to the steps involved in the grant of the EC that would make the Form 1 application liable for rejection and cancellation of any EC granted on that basis.

168. It is submitted that the Hon'ble Apex Court in the facts of ***Hanuman Aroskar v. Union of India*** reported at ***(2019) 15 SCC 401*** was of the view that EAC therein had wrongly ignored aspect of concealment and had accordingly observed at para 126 as follows:

> *"126.[…]Deliberate concealment or the submission of false or misleading information or data material for screening, scoping, appraisal or decision on the application makes it liable for rejection. That the project proponent must submit all information and data without concealing relevant features is a basic hypothesis and expectation of the 2006 Notification. EAC has, in the brief reasons which are contained in Para 3.1.2, not applied its mind at all to the environmental concerns raised in relation to the project nor do its reasons indicate an appraisal of those concerns by evaluating the impact of the project*."

However, in the facts of the present case, for the purpose of decision making by the EAC, there has not been any concealment of information – deliberate or otherwise. The answering Respondent has not presented any information in a manner which would mislead the EAC. The answering Respondent has not only made a complete disclosure of all the relevant information but has also not concealed any relevant information in its Form I. There has thus been an honest, candid, and bona fide disclosure of all the relevant

information in Form I. As a matter of fact, the said information was even supplemented by the Answering Respondent with presentations and response to the queries sought by the EAC, containing all the information to aid and assist the EAC in reaching a proper conclusion and taking the correct decision.

169. At the outset it is submitted that S. No. 24 in Form I seeks information with respect to any pending litigation against the project and/or land in which the project is proposed to be set up. The Answering Respondent correctly stated in response to the said query that there was no litigation pending in any court of law as on the said date with respect either to the project or the land.

170. As far as the question of not mentioning about the Civil Appeals filed before the Hon'ble Apex Court against the interim orders passed by this Hon'ble Tribunal is concerned, it is submitted that once the main Appeal before this Hon'ble Tribunal being Appeal No. 112/2018 was disposed of as infructuous without prejudice to the rights and remedies of the parties in accordance with, by law this Hon'ble Tribunal vide order date 20.01.2021, the interim orders and the orders passed in the appeals challenging such interim order all get merged into the said final order disposing off the appeal. As such there was no need of any separate mention of appeals filed against such interim orders. There was no deliberate concealment and the only reason why the said 2 appeals were not mentioned is because the of the reason mentioned above.

171. It is baseless and hence vehemently denied that there has been concealment about the adjoining properties on Form I.

A bare perusal of S. No. 9 under Clause III – Environmental Sensitivity ***(@Pg.369, Vol.II, Appeal)*** section shows that the details about the hostels, colleges, hospitals and religious places within 2 Km of the project site have been duly mentioned. Further a bare perusal of the 'Adjacent Feature of the Project Site' section of Appendix II to Form I A clearly shows the map and table featuring the various buildings in the vicinity of the project site such as school of correspondence, Vice Chancellor's Bunglow, Metro station, University quarters, residential properties etc. Thus, there is no concealment of any relevant information on Form I by the Answering Respondent, as is being alleged by the Appellant.

172. The allegation levelled by the Appellant that there is concealment in Form I in S. No. 34 @ Pg 13 of Form I, with respect to students residing in women hostel right adjacent to the construction site is absolutely frivolous and hence emphatically denied. The Appellant is only seeking to mislead this Hon'ble Tribunal by presenting the facts in a distorted manner. S. No. 34 of Form I ***(@ Pg. 363, Vol.II, Appeal)*** seeks information with respect to the following:-

> "*Vulnerable groups of people who could be affected by the project e.g. hospitals patients, children, elderly people etc.*".

The response given by the Answering Respondent to the said query is the correct and is in consonance with the specifics sought in the said S. No. in Form I. The information sought does even seek details about students residing in women hotel. The Appellant has further failed to show as how the women residing in women hostel fall under the category of vulnerable groups.

173. The Answering Respondent submits that similarly in Clause 7.3 ***(Pg.@ 409, Vol.II, Appeal)*** the question seeks information with respect to the following:

> "*Will the project cause adverse effects on local communities, disturbance to scared sites or other cultural values? What are the safeguards proposed?"*

The Answering Respondent submits that the said question nowhere seeks any information about the student residing in women hostel or likewise. The women hostel does not fall under the category of either sacred sites or a site with cultural values. The Appellant is misrepresenting and presenting the facts in a distorted manner thereby seeking to mislead this Hon'ble Tribunal.

174. The Appellant is yet again misrepresenting the facts and presenting the same in a distorted manner. The information sought at S. No. 1.2 @ Page 5 of Form I relates to '*clearance of existing land, vegetation and building*'. The information sought is about the existing situation at the project site and not how it used to exist before. At the time the Form I was filled up by the Answering Respondent admittedly the land parcel of the project site was devoid of any trees, which has been correctly stated by the Answering respondent in response to the information sought at S. No. 1.2 of Form I. Nowhere the information is sought as to either the past vegetation/trees on the said land parcel or if any trees were cut before the Form I was filled up.

175. Similarly, in Clause 3.2 @ Pg 45 of Form I***(Pg. 395, Vol.I, Appeal)*** the response is sought to the following query:-

> "*Will the construction involve extensive clearing or modification of vegetation? (Provide a detailed account of the trees & vegetation affected by the project)*

The Answering Respondent submits that the information sought in the said clause relates to the fact that if the proposed construction would involve any clearing or modification of vegetation on the land as it exits when the Form I was filled up. It is pertinent to mention here that the land parcel had no trees as on the date when the said Form I was filled up and accordingly, the Answering Respondent has correctly submitted a response to the following effect:

> "*No clearing or modification of vegetation is proposed.*
>
> *At present the project site is devoid of any tree. Shrubs and grasses are growing due to the project site lying vacant for a prolonged period of time. During operation phase 6113 sqm of the project site (i.e. 30.6% of the plot area) will be developed as green area."*

Nowhere any information about the status prior to the filling up of the Form I has been sought. The information as on date of filling up the Form I was sought and the same has been provided by the Answering Respondent without any concealment and by providing all the correct and relevant information, as existed on the said date.

176. It is further pertinent to mention here that the Answering Respondent had removed the said 156 trees at the construction site in the year 2011 only subsequent to receiving a valid permission dated 25.05.2011 for the same from the Forest Department. The permission from the Forest Department imposed various conditions upon the Answering Respondent and the said conditions have duly been complied with by the Answering Respondent. Regarding the compensatory plantation, a sum of rupees 43,68,000/- has been deposited by the Answering Respondent with the forest department as security with the condition that the same may be forfeited in case of default. *(Condition No.7)* Since a major

part of replantation is proposed in the project site, the project proponents are waiting for the clearances before undertaking the said plantation. The security lies in trust with the forest department and has not been forfeited. Out of the 1560 saplings to be planted, 780 saplings have already been planted by the Forest and Wildlife Department, Govt. of Delhi at ITO Chungi Park.

177. It is also pertinent to mention here that there is nothing like protected area of North Delhi Campus in any of the Act mentioned in the caption of representation by the University of Delhi viz MPD 2021, UBBL, DUAC, DFS etc. The only relevant clause in MPD 2021/Zonal Development Plan for Zone-C ("ZDP") is Civil Lines Bungalow Zone and North Campus of Delhi". The Project site is outside the boundaries of Bungalow Zone and the North Delhi Campus as is evident from the plan to the ZDP and the approved Layout Plan of University of Delhi itself.

178. It is vehemently denied that tall buildings are restricted in the area as per MPD 2021 and that the Answering Respondent has concealed the said information. The Appellant is misleading and misrepresenting the facts. It is most respectfully submitted that High rise construction in this area is not debarred in MPD. As a matter of fact, the project site does not fall within the controlled Zone of Zone C (Civil Lines) (i.e. Civil Lines Bungalow Zone and North Campus of Delhi University) and there is no restriction to the construction of tall buildings in the area. The DDA has already granted permission to the Answering Respondent for non-restricted height construction subject to approval from DUAC and Fire Department. Even MPD 2021 permits non-restricted height construction for this project. The height of the tallest tower in

the project is 145.3 mts. It is imperative to mention here that a number of high-rise buildings are already existing / under construction in the vicinity. The details of all such projects have been duly submitted by the Answering Respondent along with its Form I in Appendix II to Form I-A, which document has been filed by the Appellant itself ***(Pg. 371,Vol.II, Appeal)*** as also in the response dated 22.03.2021 given by the Answering Respondent to the queries raised by the EAC in its 62nd meeting held on 01.03.2021 ***(Pg. 462, Vol. III, Appeal).***

179. It is imperative to mention here that the Committee constituted by the Hon'ble LG on 17.02.2010 under the Chairmanship of the Engineer Member of DDA, carried out a site inspection and in its report, has categorically observed as follows:

> "…
>
> *c. 'High rise' phenomena is on the rise because it not only adds beauty to metropolis, it is solution for the rising populace.*
>
> *d. MPD 2021 also has done away with the height restriction for group housing as a major highlight and while doing so its states that this is also to facilitate creation of 'signature' projects*.
> …"

After making the said observations, the said Committee concluded as follows:-

> "…
>
> *b. High rise construction in this area is not debarred in MPD and it will also not adversely affect the girls hostel in the campus.*
> …"

The said Report was deliberated upon by the Hon'ble High Court in WP(C) No. 2743 of 2012 filed by the Appellant and the said petition was dismissed on the grounds of delay and on merits.

180. It is also relevant to mention here that the Appellant had raised the said issue even during the previous round of litigation in WP(C) No. 2743/2012. The said averments were categorically dismissed by the Hon'ble High Court in its Order dated 27.04.2015, wherein it was held that :-

> *"58.The claim of the petitioner is that the 3.05 Hectare land falls in the 'controlled zone' of Delhi University and that a height restriction ought to have been imposed on the Project otherwise it will be in direct conflict with MPD 2021. However, as submitted by ld. Counsel for respondents that there is nothing called "controlled zone" of Delhi University under MPD 2021 or Zonal Development Plan for Zone-"C". However, MPD 2021, Chapter 11-Urban Design, Para 11.3 provides that restriction on tall buildings would be necessary in important areas like Lutyen's Bungalow Zone, Civil Lines Bungalow Zone and North Delhi Campus. The plot in question does not fall within any of these restricted areas. In any case, the same was also established by respondent No.12 during arguments by showing the Zonal Development Plan for Zone-'C (Civil Lines Zone) that the land in question does not fall within any restricted area in Zone-"C" i.e. the Civil Lines Bungalow Zone or the North Delhi Campus. In fact that land does not fall within Delhi University North Campus which is established from the information obtained by respondent No.12 under RTI wherein it is stated that the 3.05 Hectare plot is not a part of Delhi University*"

181. The order 29.10.2018 passed by the Hon'ble High Court of Delhi in LPA No. 89 of 2018 (whereby the challenge by the Appellant herein to the order dated 27.04.2015 passed in WP(C) 2743 of 2012 was dismissed) was challenged by the Appellant before the Hon'ble Apex Court in SLP (C) No. 5581/2019. The said SLP was dismissed by the Hon'ble Apex

Court vide order dated 17.12.2019, resulting in the observations and the order passed by the Hon'ble High Court attaining finality.

182. It is thus submitted that the issues which have already been dealt with earlier and have attained finality cannot be raised again by the Appellant in the present proceedings.

183. The Appellant is yet again vague, baseless and misleading allegations without substantiating the same. The said allegations are denied vehemently. S. No. 3.3 and 3.4 seek information about the affect on the welfare of the people e.g. by changing living conditions and effect on vulnerable groups of people such as hospital patients, children, elderly people etc. respectively. The Answering Respondent has provided correct responses to the said queries and nothing has been concealed thereof. In fact, a bare perusal of the responses given by the Answering respondent shows that the hospitals are at a minimum distance of 460m from the project site and as such there would be no adverse impact or effect on the said hospital buildings or the patients therein. It is pertinent to highlight here that the Appellant has only raised vague allegation about the safety of the students or the so-called adverse effects on the vulnerable groups of the society such as patients, elderly people etc. The Appellant has failed to detail out or show as to how the present project would have any adverse effect on any person in the vicinity of the project. The Appellant is only raising frivolous allegations just for the heck of it and that too without furnishing any evidence or document to substantiate the same. Accordingly, the said allegations levelled by the Appellant deserve to be dismissed at the outset.

184. The Appellant's contention that the Answering Respondent that the Answering Respondent has not disclosed about the Principal's Residence (Delhi University) and Delhi University Office has not been disclosed in S. No. (III) (1) ***(@ Pg. 369, Vol.II, Appeal)*** is absolutely frivolous and hence denied. S. No. III (1) seeks the following information:-

> "*Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value"*

It is most respectfully submitted that neither does the Principal's Residence (Delhi University) nor the Delhi University Office fall within the areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value. Accordingly, there has been no mention about the said 2 buildings in the Form I.

Further, it is pertinent to note that DRDO Bhawan is an office of the said establishment and not a "Defence Installation". Further, it is farcical to argue that DRDO Complex or the Officers enclave, which is a residential establishment, would be a "Defence Installation".

In Re: The dissent of two members of the SEAC which had earlier appraised the EC dated 23.03.2018 granted earlier to the project has not been considered. [Paragraph 25 (oo)]

185. It is submitted that the alleged non -consideration of the dissenting opinion of the 2 members of SEAC vide their respective letters has not been taken into consideration while appraising the project, as detailed out in para 25(oo) of the appeal are denied.

186. A bare perusal of the previous paragraphs clearly shows that all the points raised in the said letters have been duly taken into account and all the objections/points raised in the said 2 letters have been carefully dealt with while granting the EC for the present project. Paragraph 147-152 above shows that the objections raised by the said 2 members about the buildings having significant seismic hazard risk has been dealt with and appropriate preventive/corrective measures have been detailed out which would be adhered to by the Answering Respondent. Similarly, paragraph 52-93 above deals with all the objections taken with respect to ground water.

In Re: Report of committee constituted by L.G. Delhi gave finding that the project would have adverse impact on traffic load and on ambience of Delhi University [Paragraph 25(pp)]

187. The Appellant is yet again making baseless and misleading averments with regard to the report by the LG, Delhi and accordingly the contents of paragraph 25(pp) are denied. The Appellant is raising objections which were raised earlier also and which have attained finality on account of the fact that the said objections have been rejected by the Hon'ble High Court of Delhi, which order was further upheld by the Hon'ble Apex Court.

188. It is crucial to note that the Appellant has misrepresented the dissenting opinion of the Jt. Committee constituted by the Hon'ble LG as the majority opinion. This constitutes gross and material suppression as well as misrepresentation of facts. That on this ground alone, the present Appeal ought to be dismissed.

189. During the meeting chaired by the Hon'ble LG on 17.2.2010, it was observed by some of the members that the proposed high-rise development near Vishwavidyalaya metro station would be discordant to the adjoining Delhi University, North Campus. Specific objections were voiced regarding nearby Girls hostel being overlooked by the occupants of high-rise apartments proposed by DMRC. Parking problems were also feared. Accordingly, the Hon'ble LG, on 17.02.2010 itself, constituted a committee of experts under the Chairmanship of the Engineer Member of DDA and comprising of other members being the Chief Town Planner, MCD and Chief Engineer, DMRC for a report after a joint inspection of the project site.

190. The said committee of experts comprising of Sh. V.K. Bugga, Chief Town Planner, MCD and Sh. S. Jethwani, Chief Engineer, DMRC visited the site and carried out a site inspection on 19.2.2010 at 09.30 A.M. Subsequent to the visit and inspection a joint inspection report was filed, which report has been signed by both the said Members present during the inspection. The said inspection report was duly considered by the Hon'ble LG in light of the objections raised by the Appellant herein vide its Representation. The said joint report observed the following aspect in relation to the project site:-

a. The site visit revealed that thick foliage completely covered the screen of the girl's hostel buildings, thereby affording due privacy
b. Height also does not provide a vantage position to intrude into the privacy, as seen in the photo taken from height. (Ref. 3.2 of the joint inspection report) In fact, the higher one goes the visibility suffers more. Due to

haze around, even the binocular vision does not help to see any object clearly at ground/low rise buildings level.

c. 'High rise' phenomena is on the rise because it not only adds beauty to metropolis, it is solution for the rising populace.

d. MPD 2021 also has done away with the height restriction for group housing as a major highlight and while doing so its states that this is also to facilitate creation of 'signature' projects.

e. Close to this site (on another DMRC site), a multi-storied group housing has been approved at Khyber Pass, recently.

f. The proposed buildings by DMRC are aimed at producing iconic development, as an Island of excellence, inspiring improvements around.

g. For Academic & Administrative buildings MPD 2021 allows 10 to 12 storeys/ up to 37mtr. height (Table 13.6: Development controls for Educational Facility: Higher Education). Residential development in university area shall be regulated as per Group Hosing norms (Table no. 13.6), which inter-alia allows greater FAR with no height restriction applicable. This would encourage high-rise construction as a part of redevelopment plans for optimal land utilization, for catering to growing demands within the campus, retaining open & green spaces.

h. Any attempt to restrict the height of buildings would result in more Ground coverage, resulting in sacrificing of open and green spaces/ cutting of more number of trees, full grown and very old trees; it is therefore not desirable.

i. Complete parking for the proposed residential development required as per MPD norms viz. 924 ECS, has been planned at site itself in the form of multiple basements/stilt space. Parking problem will not at all aggravate due to this development.

j. The work will be taken up only after sanction of Plans including approvals from regulatory/statutory authorities DUAC /CFO/ASI/ Min. of Environment etc.

Based upon the various observations made during the joint inspection, the said expert committee made the following conclusion and remarks in their joint inspection report:-

a. Proposed development will not affect the privacy of the girl's/women hostel nearby, as these are either far (e.g. Miranda House) or interspersed by other buildings (i.e. Meghdoot Hostel) and are covered by greenery etc.

b. High rise construction in this area is not debarred in MPD and it will also not adversely affect the girls hostel in the campus.

c. Only 146 salable units/ flats planned are not expected to result in exceeding density as per MPD for that area. Full provision as per MPD, will not add to parking problems.

d. The nature of development proposed by DMRC in the form of a small no. of exclusive, elegant and spacious apartments, with all amenities including landscaping and beautification of the site, may not affect the serenity/ tranquility of university area.

e. Iconic development proposed on this site may rather improve the impression at the Gateway to university area though urban design is to be seen and approved by DUAC.

It can thus be seen that even the report of the expert committee constituted by the Hon'ble LG gave its observations in favour of the project and no adverse impact of the project was observed. Infact, in view of the remarks and conclusions reached upon by the said expert committee constituted by the Hon'ble LG, it can safely be concluded that the various objections raised by the Appellant University are just a sham and the same have no concrete/solid base.

191. It is also pertinent to mention here that the said joint inspection report by the said expert committee constituted by the Hon'ble LG was also brought before the Hon'ble High Court of Delhi in WP (C) No. 2743/2012. The Hon'ble High Court after due consideration of all the facts and reports, vide order dated 27.04.2015 was pleased to dismiss the petition filed by the Appellants. The said order was subsequently upheld by the Hon'ble Division bench of the Delhi High Court as well as by the Hon'ble Apex Court when the SLP filed impugning the order dated was dismissed. Thus, the said objections cannot be raised by the Appellant yet again as the same have been decided and the said decision has duly attained finality.

192. The said objection was raised by the Appellant by way of its Representation dated 02.03.2021 also. The EAC sought a detailed response from the Answering respondent to the said Representation in its 62nd Meeting held on 01.03.2021. The Answering Respondent gave a detailed reply to all the objections raised by the Appellant vide its Representation in its reply dated 22.03.2021. The copies of the said

Representation and the response by the Answering Respondent are already on record.

193. The EAC, in its 64th meeting held between 12th – 13th April 2021, considered the various objections raised by the Appellant along with the responses given by the Answering respondent vide its reply dated 22.03.2021. It was only after due satisfaction of the members of the EAC with respect to the responses/clarifications provided by the Answering Respondent and detailed discussions on all such issues raised, that the EAC recommended the issuance of the EC to the Answering Respondent for the project in question, subject to various conditions. As stated above, the said report by the Joint Committee constituted by the Hon'ble LG, Delhi was in favour of the Project proposed by the Answering Respondent and as such did not detail out any adverse impact or effects on either the surroundings or found the same to be in contradiction to any of the existing laws

In Re: One member of the Subcommittee constituted by SEAC during grant of previous EC had found that the project will affect the general environment.

194. The contents of para 25(qq) of the Appeal are admitted to the extent that one of the members of the Sub-committee constituted by SEAC ('**SEAC Sub-committee'**) had given a dissenting view to the effect that the said member expressed his apprehensions on the efficient monitoring by the agencies in respect of the project proposed by the Appellant. The Appellant is however seeking to yet again mislead this Hon'ble Tribunal and create prejudice by bringing forth incomplete and distorted facts before the Hon'ble Tribunal. The Appellant is admittedly relying upon a minority report of the said sub-committee. The *malafide* intent of the Appellant

can be seen from the fact that the Appellant has deliberately failed to bring forth to notice and on record the majority view/report of the said sub-committee and the observations therein.

195. Admittedly, the SEAC Sub-committee was constituted vide letters dated 13.12.2011 and 22.12.2011 to consider the issues raised by the Registrar, University of Delhi. The said SEAC sub-committee consisted of five members *viz*. (i) Shri Chinmaya R. Gharekhan, (ii) Dr. A. K. Ambasht, (iii) Prof. Subir Saha, (iv) Dr. (Mrs.) P. Malarvizhi and (v) Dr. Anil Kumar. After due deliberations, a report was filed by the said members wherein one member being Shri Chinmaya R. Gharekhan gave a dissenting view to the extent that he expressed his apprehensions on the efficient monitoring by the agencies, despite agreeing with the fact that the builder had satisfies all the legal requirements.

196. The said SEAC Sub-committee, vide its report came to the following conclusion:

> "***Conclusion****: After considering the papers submitted by the Young Builders regarding mutation, lease documents, traffic study, court direction committee report constituted by Hon'ble LG, tree cutting permission and discussions held on 24.o2.2012 besides site visit of o2.o2.2012, the subcommittee is of the opinion that Delhi University has no right to agitate their contentions before SEAC in such a manner. Some of the contentions are just apprehensions and the same are nullified as per facts viz. the entry to Chhatra Marg, privacy to women's hostel and residential area, cutting of trees. The Delhi university may not infringe the legal right of M/s Young Builders. Moreover, any deviation at this stage from the court direction will amount to contempt of court. University may settle their grievances over the transfer of land to Young Builders by taking legal resources*

before the Court of Law. However, looking the papers, nothing irregular could be noticed.

The said development being taken up is totally legal and the SEAC may proceed to appraise the project primarily with respect to environmental concerns and within the provisions of EIA notification dated 14.9.2006 and its amendments. The SEAC may countercheck the compliance orders made in the LG's report and may consider moderation in the height of the project buildings for solar rights of nearby buildings, if any."

It is pertinent to note here that the SEAC Sub-committee, while finalizing its recommendations for the grant of the EC, did take a note of the dissenting observations by Mr. Gharekhan, but finally reached a conclusion based on the majority view taken by the said SEAC Sub-committee. It is however imperative to mention here that the said recommendation has been accepted and countersigned by Mr. Gharekhan. Subsequent thereto, based on the said recommendations of the SEAC Sub-committee, the EC was granted to the Answering Respondent by SEAC/SEIAA.

197. It is submitted that the said report by the SEAC Sub-committee was also presented before the Hon'ble High Court in WP(C) No. 27.04.2015, wherein after due deliberations the said petition filed by the Appellant was dismissed on merits and on the ground of delay and laches. As stated above, the said order has attained finality.

198. It is accordingly, submitted that after the SEAC Sub-committee (majority) report wherein the said committee was of the view that the project caused no harm as was being portrayed by the Appellant and even recommended for the issuance of the EC, being accepted and attaining finality, it is illogical on the part of the Appellant to allege in the present

appeal that the dissenting dissenting observations by Mr. Gharekhan ought to have been considered by the EAC/MoEF while granting the EC to the Answering Respondent. At the risk of repetition, it is stated that despite having contrary views even Mr. Gharekhan had agreed with the fact that the builder i.e. the Appellant had satisfied all the legal requirements even at that time. Further, the said facts were duly brought to the knowledge of the EAC by the Answering Respondent vide its Representation dated 22.03.2021 and the same has been duly considered by the EAC before being satisfied by all the clarifications presented by the Answering Respondent and while recommending the issuance of the EC to the Answering Respondent

In Re: Order dated 10.02.2020 of this Hon'ble Tribunal with regards to undertaking carrying capacity of the area has not been ensured for evaluating the project in question [Paragraph 25(rr)]

199. The contents of paragraph 25(rr) of the Appeal are baseless, frivolous and hence vehemently denied. The Appellant is yet again making bald and baseless averments without substantiating the same. A perusal of the previous paragraphs clearly shows that the EAC has evaluated all the aspects related to the environment such as water, air, pollution, effect on the nearby areas etc. in great detail and have evaluated even minute details before recommending the grant of EC for the project to the Answering Respondent.

200. The 62nd Minutes of Meeting of the EAC, as relied upon by the Appellant itself, itself shows the sequence of events and various issues identified independently by EAC and accordingly a response has been sought from the Answering Respondent on the said issues. The relevant portion of EAC

MoM is set out below for better clarity: ***(@ Pg. 459,Vol.III, Appeal)***

> "…
>
> *7. The EAC (Infra 2), based on the information submitted and clarifications provided by the Project Proponent and detailed discissions held that the submissions made by the PP require certain revisions as mentioned above. In view of the foregoing, the EAC recommended to defer the decision on the project and asked the PP to provide the following information:*
>
> *i. Clarification for the proposal of 2 basements with reference to recommendation of the committee constituted by NGT and Supreme Court Order.*
> *ii. Analyse the discrepancies and resubmit the conceptual plan after making the necessary revisions. Water balance flowchart needs to be revised.*
> *iii. Air pollution management in the context of Graded Action Plan for Delhi & NCR.*
> *iv. Point-wise replies to representation made by Delhi University*"

Hence, it is clear from the above that, the EAC specifically asked for information pertaining to the aspects which would affect the carrying capacity of the project area. This therefore shows that, the EAC had very much considered, each and every objection raised at even by the Appellant herein through its Representation and other letters, as also the response given by the Answering Respondent herein. The very fact that a response is called for again on specific points relating to water, air and basement issues, despite the same having been dealt with and explained, shows that there was proper application of mind by the EAC to the objections raised by the University as well as the observations made by this Hon'ble Tribunal vide its order dated 10.02.2020 in the earlier

round of litigation, as well as responses given by the Answering Respondent.

201. It is submitted that the role of the EAC is for project appraisal for grant of EC. EAC MoM records independent application of mind by EAC and since in the expert opinion of EAC, there is no adverse environmental impact and all other aspects have been well taken care of, the EAC has recommended grant of EC for the project to the answering Respondent. The EAC deliberated upon the issues raised by the Appellant in its Representation dated 02.03.2021. Upon finding that the issues relating to the carrying capacity of the area in terms of water, air and basement issue was not satisfactorily responded to by the Answering Respondent, a response was sought to the said queries from the Answering Respondent. The Answering respondent thereafter submitted a detailed point-wise response to each and every query raised. It is only after a detailed discussion and satisfaction of the experts of the EAC that the said EAC proceeded to recommend the grant of the EC. Therefore, it is wrong to suggest that no carrying capacity study has been conducted or considered while appraising the present project. In support of its contentions, it is submitted that the contents of the previous paragraphs relating the issues of water, air, basement and other queries raised by the Appellant are reiterated here and the same are not being repeated herein for the sake of brevity.

202. It is submitted that the review of the decision-making process by the EAC has been considered by the Hon'ble Supreme Court in the ***Central Vista Case*** reported at ***(2021) SC OnLine SC 7***, wherein the Hon'ble Supreme Court has held:

"***181**. Another dimension to be kept in mind is the factum of subjective satisfaction of the executive. The law regarding the involvement of constitutional Courts in public interest in cases involving subjective satisfaction is well settled.* ***The interference of Courts is neither warranted to look into the quality of material relied upon by the Government to approach a decision nor to adjudicate upon the sufficiency of such material.*** *These matters are of a subjective character and if legislature permits subjective powers on one organ of the State, the other (in the name of judicial review) is not expected to substitute its own subjective opinion in its place.* ***The sole concern of the Court is to look at the relevancy of the material relied upon to take a decision in order to see that the decision is not devoid of application of mind. It is based on the basic idea that the structure of a subjective decision stands on the foundation of objective reasons****. The Court may interfere when a decision is devoid of any reason or affected by malafides or when the decision is reached in the aftermath of statutory violations.*

…..

380**. ….Upon examination of the minutes of meeting dated 23.4.2020 as approved on 30.4.2020 and notice of meeting dated 16.4.2020,* ***we have observed that all documents, presentations, designs etc. were placed before all members of the Committee well in advance and they were equipped enough to examine the subject project within their mandate and advise the Government*. In Committee's observation, the grant of no objection is an in-principle approval coupled with a suggestion that "the features of the proposed parliament building should be in sync with the existing parliament building". This observation is indicative of the due awareness on part of the Committee of heritage requirements relating to Grade-I precincts.* ***Merely because the minutes do not advert to any specific documents already placed before the members of the Committee, it does not follow that the members did not discharge their duty properly. Indisputably, the relevant documents were placed before all the members at least a week before the Committee meeting and understandably, a week's time was granted to all the members for examining the documents. In***

such circumstances, it cannot be assumed that the documents and presentations escaped the minds of the Committee members until and unless a demonstrable infirmity is shown*.*

……

494*. The minutes of the two meetings of EAC are self-explanatory and reveal due application of mind, in light of the principles relating to application of mind enunciated above. We do not wish to repeat the same to avoid prolixity. EAC is an expert body and it is amply clear that it has been made aware of all relevant information relating to the project and it has applied its mind to the proposal. Even on settled principles of judicial review, it is clear that relevant material has been considered by the committee and no reliance has been pointed out on any irrelevant material. The specific recommendations given by the committee do indicate that the committee was aware of the need for precautionary measures in environmental matters and accordingly, it suggested requirement of further permissions on certain counts.*

…..

495. Once an expert committee has duly applied its mind to an application for EC, any challenge to its decision has to be based on concrete material which reveals total absence of mind. Absent that material, due deference must be shown to the decisions of experts*. The facts of the case do not reveal any deliberate concealment of fact/information from the EAC or supply of any misinformation."*

(emphasis added)

In line with the holding in the ***Central Vista Case,*** even in the present case, the information, documents, studies and presentations were available with the EAC in advance so the EAC was equipped to examine the subject project.

203. In any case, it is submitted that the 9-member expert committee was also appointed by this Hon'ble Court in Appeal No. 112 of 2018, which came out with its Report on 10.12.2020 ***(@ Pg. 252-302, Vol.II, Appeal)***. That the said Committee conducted a detailed and thorough carrying

capacity assessment of all the multiple environmental facets of the Project including traffic, air pollution, noise emission, ground water, seismicity etc. Thus, it is false to say that a carrying capacity assessment has not been undertaken. Further, it is submitted that the in the Minutes of the Meeting of EAC, the Answering Respondent was asked to submit point-wise response to various issues raised by the Appellant and only thereafter, EAC considered the same. Therefore, it is wrong to suggest that there has been no application of mind by EAC or that the EAC/MoEF did not consider the importance of analysis of the carrying capacity of the area in question before appraising the project in question. Further, it is important to note that many of the allegations raised against the present EC were already raised before the Hon'ble High Court and have been decided finally by the Hon'ble High Court as well as the Hon'ble Supreme Court.

204. It is submitted that the EAC duly deliberated upon the presentation by the Answering Respondent along with its reply dated 22.03.2021 to the queries raised by the EAC, especially in respect of the concerns with respect to the carrying capacity pf the project area in reference to the water, air and double basement issue. The EAC in their expert opinion, based on material before them, have fully applied their mind and has stipulated conditions with regard to various parameters in the EC, additionally, to ensure that there are no adverse impacts in respect of the carrying capacity of the area with respect to the issues regarding water, air etc. These conditions will also mitigate any anticipated impact due to the project. The conditions prescribed by EAC/MoEF are a testimony of the serious diligence and application of mind by the members of the EAC

and all the factors raised in the earlier round of litigations have been duly taken into consideration and addressed.

In Re: Impact on Population Density not given due attention to which is already an underestimate [Paragraph 25(ss)-(xx)]

205. The contents of Para (ss) of the Appeal are denied to the extent the same being presented in a distorted manner to mislead this Hon'ble Tribunal. The 9-member Expert Committee was formed by this Hon'ble Tribunal in Appeal No. 112 of 2018, pursuant to various objections raised by the Appellant against the Environmental Clearance granted by the SEIAA on 23.03.2018. As per the directions of this Hon'ble Tribunal, the said Committee comprised of the following senior officials:

S. No.	**Name and Designation**	**Organization**	**Committee Members**
1.	Dr. Prashant Gargava, MS	CPCB	Coordinator
2.	Dr. Vinod K. Singh, Scientist - 'E'	MoEF&CC	Member
3.	Mr. N Bala, Scientist - ' F'	Indian Council of Forestry Research and Education, Dehradun	Member
4.	Mr. Jyoti Kumar Nalli, Scientist - 'D'	Central Ground Water Board, New Delhi	Member
5.	Dr. Meenakshi Dhote, Professor	School of Planning and Architecture, New Delhi	Member
6.	Dr. Vikram Gupta, Scientist - 'F'	Wadia Institute of Himalayan	Member

		Geology, Dehradun	
7.	Mr. S. Tarafdar, Scientist - 'E'	G.B. Pant Institute, Srinagar-Garhwal	Member
8.	Dr. Mukesh Sharma, Professor	IIT Kanpur	Member
9.	Mr. Shambhu Sharma, Joint Adviser	National Disaster Management Authority, Govt. of India	Member

206. The Ld. Committee conducted its proceedings in an extremely transparent manner which is evident from the Minutes of the six (6) Meetings conducted by the Ld. Committee. The Ld. Committee has specifically noted in its Report that the contentions of the Appellant were examined while also referring to the Documents relied upon by the Appellant. The Ld. Committee has conducted an evaluation of each of the environmental issues while relying on independent statistical data and findings, being un-influenced by the Order of this Hon'ble Tribunal dated 27.02.2020, and recorded reasons for each of its inferences with respect to the said environmental issues. After conducting a detailed analysis of all environmental factors (air pollution, water requirement, traffic congestion etc.) the said Committee was pleased to observe that project proponents have obtained necessary approvals/ clearances from authorities and specifically noted that,

> *"In view of the impact analysis, **the project seems** viable as environmental impacts, including impact on traffic congestion and urban infrastructure/services, are minimal/nominal."*

207. It is settled law that the nature of reasoning in the Report/Order of a quasi-judicial body or an Expert Committee is different from that rendered in a Judicial Order. Since an Expert Committee is not a Judicial Body, it is not required to give elaborate reasons qua each of the point raised by the parties, however, its Report must be in the nature of a speaking Order and contain adequate and tangible reasons for arriving at its conclusions. Reference here is made to the judgment by the Hon'ble Apex Court in the case of ***S.N. Mukherjee v. Union of India*** reported at ***(1990) 4 SCC 594*** held that,

> "*36. [….] In our opinion, therefore, the requirement that reasons be recorded should govern the decisions of an administrative authority exercising quasi-judicial functions irrespective of the fact whether the decision is subject to appeal, revision or judicial review.* ***It may, however, be added that it is not required that the reasons should be as elaborate as in the decision of a court of law. The extent and nature of the reasons would depend on particular facts and circumstances.*** *What is necessary is that the reasons are clear and explicit so as to indicate that the authority has given due consideration to the points in controversy*."
>
> (Emphasis Supplied)

208. It is most humbly submitted here that the Report by the Expert Committee in Section III ***(@ Pg. 266, Vol.II, Appeal)***, ofthe Report observes as follows:-

> "*The impact of proposed project on population density of the area was examined. As evident from the 2 kmx2km imagery grid of the project site, it is a densely habited area. The land use distribution indicates that largest land-use in the grid is under Public & Semi-Public facilities (36.5%) followed by residential (28.3%) and government (11.5%) facilities.* ***The grid falls in 6 wards and out of these most of the area lies in the Timarpur ward (59.7%)."***

It is most submitted here that on account of the fact that Timarpur ward in the grid being the largest ward in the grid,

the increase in the population density due to the proposed project was estimated using the population density in the said ward. The reason has been duly recorded in the Report also. (@ ***Pg. 269,Vol.II, Appeal***)

209. The Expert Committee notes that the Project Impact Zone/Grid falls in 6 wards and out of these most of the area lies in the Timarpur ward (59.7%). The Ld. Committee further notes that since Timarpur ward is the largest ward in the grid, the increase in population density due to the Project was estimated using present population density in Timarpur ward as baseline. In view thereof, it is evident that the Ld. Committee has given cogent reasons for choosing Timarpur Ward as the baseline and by no stretch of imagination can it be said that the Ld. Committee has not applied its mind while analyzing the Impact on Population Density. Further, the Appellant has presented an incomplete picture with respect to the findings of the Ld. Committee *qua* population density. In fact, the Ld. Committee notes that Committee in the summary observations on the viability of the Project observed as under *(@* ***Pg. 283, Vol.II, Appeal)***

> "*Population density: Timarpur ward is largest ward in the grid and an incremental increase in the population was estimated in this ward. The estimated increase in the population density in the Timarpur ward will be 6777 persons per sq. km. The percentage increment in the ward will be 14%. This increase is significant; however, tall residential buildings do give higher population density. This increase in density is not likely to impact the urban infrastructure/ services, as noted above."*

Accordingly, there is nothing wrong in approach of the REIAC in confining its study to the Timarpur Ward.

210. It is crucial to note that the increment in population density worked out at 14% is actually correctly 11%, if the correct calculations are made basis the population / density in the Layout Plan approved by the North DMC. In the said Layout Plan the total number of residents are calculated as 1541 persons against 1947 calculated by Ld. Committee. Even with a higher figure, the Ld. committee has found the impact as insignificant vis-à-vis the impact on the urban infrastructure and services.

211. It is submitted that the Appellant cannot be allowed to substitute its own views/suggestions for that of the Ld. Expert Committee and then argue that the process undertaken by the Ld. Committee is arbitrary in nature. The 2020 Expert Committee Report contains thorough reasons for each of its conclusions as is clear from the perusal of the report filed by it and as also from the foregoing paragraphs.

212. The contents of Para (tt) of the Appeal are denied to the extent that there was no logical explanation for the reduced area of impact zone considered by the Expert Committee. The Committee comprised of experts and have carried out their investigation for the limited area of 2 Km by 2 Km based on a valid reason, which has also been recorded in the report filed by the said committee. The Ld. Committee deliberated on how to select impact area and the representative of the MoEF & CC noted that the impact zone is defined only for the Projects covered under Category A of the 2006 EIA Notification. Accordingly, the Minutes of Meeting of the Committee dated 05.08.2020 categorically records as follows: ***(@ Pg. 294-295,Vol.II Appeal)***

> "*Area within five km radius of the project site may be considered for examining available data on various environmental parameters, such as air quality, water quality, ground water levels, waste management plans during construction stage and post construction stage, etc., though, as informed by the representative of MoEFCC, impact zone is defined only for the projects covered under A category. The present project fall under B category***.**

A perusal of the above passage would show that the Ld. Committee deliberated on how to select impact area and the representative of the Respondent No.1/MoEF & CC noted that the impact zone is defined only for the Projects covered under Category A of the Environmental Impact Assessment Notification dated 14.09.2006 ('**2006 EIA Notification'**). It is an admitted position that the Project of the Answering Respondent falls under Category B. In view of the same, the Ld. Committee chose the area of 2km x 2km as the impact zone to assess the viability of the Project. The area of 2km x 2km to be examined for the impact zone was decided on account of the said reason and the same is also duly recorded in the report in the following terms ***(@ Pg. 283, Vol.II, Appeal)*****:**

> **"***To assess the impact on the environment, the incremental impact of the project was examined. It was then inferred if the impact was insignificant or otherwise in comparison to baseline status. The impact was examined in a grid of 2 km x 2 km (project site at the grid centre) as the maximum impact will be caused in the close vicinity of the project."*

213. Therefore, it cannot be said that the Ld. Committee did not supply reasons or did not apply its mind since the minutes of the meeting and the explanation rendered therein reflect the decision-making process adopted by the Ld. Committee.

214. It is submitted that the environment impact assessment zone is calibrated on the basis of the nature of the Project in question. Thus, Category A Projects, which have a larger environmental footprint, have a more rigorous assessment and a greater area for assessing the potential environmental impact. This principle has been followed in the EIA Notification of 2006 as well.

215. It is important to bear in mind that the present Project is a one-time construction project, wherein the environmental impact is restricted to the construction phase and is site-specific. It is not a continuous polluting industry. Therefore, even the impact zone for the project would have to be suitably calculated. It is for this reason that the EIA Notification of 2006 also prescribes different modes of appraisal for projects under Category A, B1 and B2. The EIA Notifaction of 2006 notes that,

> *"4. Categorization of projects and activities:-*
>
> *(i) All projects and activities are broadly categorized in to two categories - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health and natural and man made resources.*
> *[….]*
>
> *I.Stage (1) - Screening:*
>
> *In case of Category 'B' projects or activities, this stage will entail the scrutiny of an application seeking prior environmental clearance made in Form 1 by the concerned State level Expert Appraisal Committee (SEAC) for determining whether or not the project or activity requires further environmental studies for preparation of an Environmental Impact Assessment (EIA) for its appraisal prior to the grant of environmental clearance depending up on the nature and location specificity of the project .* ***The projects***

> ***requiring an Environmental Impact Assessment report shall be termed Category 'B1' and remaining projects shall be termed Category 'B2' and will not require an Environment Impact Assessment report.*** *For categorization of projects into B1 or B2 except item 8 (b), the Ministry of Environment and Forests shall issue appropriate guidelines from time to time."*

216. Further, while in Category A and B1 projects, the ToR have to be prepared and a public hearing is done, the same process is not applicable to Category B-2 projects since they entail lower environmental impact.

217. As per the EIA Guidance Manual for Building and Construction Projects, the EIA is to be done for two study areas, i.e. a) primary data for study area within 10 km study radius, which includes the biological environment such as distance from National parks or presence of wild animals or birds, b) secondary data within an aerial distance of 15 kms from the boundary of the proposed project area which delineates environmental sensitive areas as specified in Form I of EIA notification. The answering Respondent has provided both the primary and secondary data with its Form-I.

218. The contents of Para (uu)-(xx) of the Appeal are denied. The 9-member expert Committee has applied its mind, given cogent reasons and arrived at a calculation for the increase in population density. The Appellant cannot substitute its own view for that of the Expert Committee, and that to, without giving any substantive reason. Further, a detailed carrying capacity study has already been undertaken by the 9-member expert committee appointed by this Hon'ble Tribunal, in light of Order of ***Ajay Khera v. Container***

Corporation of India reported at ***2018 SCC OnLine NGT 2188.***

In Re: No specific details considered on waste management of the project in question [Paragraph 25(yy)]

219. A bare perusal of the Application for EC made by the answering Respondent would reveal that a detailed waste management disposal plan has been shown to the EAC which includes, ***(@Pg. 358, Vol.II, Appeal)***

"Solid Waste:

Construction Phase:
Construction and demolition waste generated from the project site is expected to be 6900 T in three years period. The waste will be disposed at C&D waste management facility through authorized C&D waste collectors. There are four C&D waste disposal facility available in Delhi viz. Burari, Jahangirpuri, East Kidwai Nagar and Shastri Park.

Operation phase:
Solid waste generated from project will be about 1.4 TPD. Solid wastes generated will be segregated into biodegradable (0.85 TPD) and non-biodegradable waste (0.55 TPD) and collected in separate bins. The biodegradable wastes will be composted in an on-site composting unit and the manure will be used for landscaping. The non-biodegradable/ recyclable wastes will be disposed through North DMC.

Liquid Effluent:
During Construction Phase, Wastewater generated from will be 18 kld. Toilet waste water, which will be disposed in mobile toilets / ecosan toilets/ septic tank & soak pits.
In operation phase, the sewage (175 kld) will be treated up to tertiary level in an on-site STP of 210 kld capacity. The treated waste water will be used for flushing (52 kld) and for landscaping (12 kld). Surplus treated water of 96 kld will be disposed in public sewer.

Further, regarding Hazardous Wastes, the answering Respondent has provided the following facilities, ***(@ Pg. 363, Vol.II, Appeal)***

> *Construction phase:*
> *Hazardous waste generated are expected in the form of paint, varnish, solvents, adhesives carrying containers and spent oil from DG set used in construction purpose.*
> *Operation Phase:*
> *Hazardous wastes in the project will be used /spent oil from backup DG sets, which is classified as Hazardous Waste Category 5.1 as per Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.*
> *Spent Oil from backup DG sets will be carefully stored in HDPE drums in isolated covered facility provided with garland drains. This spent oil will be sold to authorized recyclers. Suitable care will be taken so that spills/ leaks of spent oil from storage could be avoided.*

220. The Appellant has erroneously claimed that no details of the STP, use of technology, location of plant the area required for its installation, and the location and mode of disposal of discharge after the treatment, for the STP to be installed by the answering Respondent and further that that there is no approval from SPCB which has been taken by Project Proponent under Solid Waste Management Rules 2016.

221. The above allegations are patently false. In the point-wise replies furnished by the answering Respondent, before the EAC, it was stated that, ***(Form I@ Pg. 389, 392, Vol.II, Appeal & Response of answering Respondent @Pg. 534-535, Vol.III, Appeal)***

> *"Reply:* ***The project proponent is not the operator of any Solid Waste Management Plant. However, the project proponent will make an application for consent to establish from the Delhi Pollution Control Committee (DPCC) once the EC is granted. EIA notification does not require clearance from other departments as a pre-requisite.***

Segregated solid waste from the project site shall be sent to approved solid waste management facilities for final disposal.

An STP of 210 kld capacity based on MBR technology is proposed to be installed within the project basement in an area of 380 sqm. Part of the treated effluent (64 kld) will be recycled for flushing and landscaping purpose. Some part of the treated effluent based on the requirement of the Delhi Jal Board and the local forest department shall be used for dust suppression along roads and for road side plantation. Balance treated effluent not exceeding 96 kld will be discharged in the public sewer. Complete details have already been submitted along with Form I, Form IA and Conceptual Plan."

222. In fact, not only the EAC but even the Report of the Committee constituted by this Hon'ble Tribunal also analyzed the aspect of solid waste management and opined that,

"*An increase of 1.27% from the present generation of solid waste in the grid is estimated.*

A solid waste management plan for occupancy phase has been examined. It is noted that waste will be collected into separate biodegradable and non-biodegradable waste bins. Biodegradable waste will be treated in organic waste convertor in the premises, however capacity of convertor and technical details are not being provided. The recyclable waste will be handed to recyclers. The horticulture waste and STP sludge will reportedly be composted and used as manure.

INFERENCE
An increase of 1.27% from the present generation of solid waste in the grid is estimated due to the project."

In Re: Consent to Establish has not been obtained or considered as per OM dated 05.02.2020 of MOEF&CC [Para 25(zz)]

223. On 02.08.2021, the answering Respondent addressed a representation to the DPCC seeking its opinion on the need to obtain a Consent to Establish ("**CTE**") for the Project. This clarification was sought in view of the fact that the DPCC was

not issuing CTE(s) for buildings housing residential apartments units following the Judgment dated 23.01.2012 of the Hon'ble High Court of Delhi in LPA No. 895 of 2010 in the matter of ***Delhi Pollution Control Committee vs Splendor Landbase Ltd.*** wherein the Hon'ble High Court had taken a view that a CTE was not required for residential housing units. In the said Judgment, the Hon'ble High Court held that,

> "*27. To summarize the position under the Water Act the position may be summarized thus: Section 25(1) of the Water Act would apply where a building is proposed to be constructed to set up an industry or any on an operation or a process as explained in para 21 above and this would mean that the Water Act would not apply to buildings housing residential apartments/units. It would apply to all other buildings where effluent or trade effluent is discharged, be they where manufacturing activity is carried on, sale or purchase of goods is carried on or services are provided.*
> *[...]*
> *34. For our reasoning herein above pertaining to the Water Act, the said reasoning of the learned Single Judge pertaining to the Air Act is overruled, but would make no difference to the final conclusion arrived at by us pertaining to the applicability of the Air Act when construction activity commences in respect of shopping malls and commercial shopping complexes for the reason, prior consent to establish the same is required on the language of Section 21 of the Air Act in view of the expanded definition of the expression industrial plant. But, for residential complexes, we hold that neither to establish nor to operate, (in fact the concept of to operate is not even applicable to a residential complex), any permission is required under the Air Act. "*

224. On 27.08.2021, the DPCC wrote to the MoEF & CC (Respondent No.1 herein) calling their attention to the subject EC wherein a condition has been imposed regarding obtaining a CTE for the Project [Standard Condition (B)(I)(v)]. The DPCC stated that in view of the Judgment of the Hon'ble High Court in ***Splendor Landbase Ltd.(Supra),*** it is not

issuing CTE(s) for residential housing projects. Further, the DPCC has filed an SLP against the above judgment, which is pending before the Hon'ble Supreme Court.

225. The process for obtaining an EC is digitalised and the only reason that the answering Respondent has not been able to obtain the CTE is that the DPCC does not give an option for applying for CTE for a housing project. Thus, the answering Respondent could not apply for the CTE as its hands were tied. The answering Respondent undertakes to comply with the requirement for CTE, depending upon the reply from the Respondent No.1/MoEF &CC.

A Copy of the Letter sent by the Respondent No.2 to the DPCC dated 02.08.2021 is annexed herewith and marked as ***ANNEXURE R-24. (From Pg. 1324 to 1325)***

A Copy of the Letter dated 27.08.2021 sent by the DPCC to the MoEF & CC is annexed herewith and marked as ***ANNEXURE R-25. (From Pg. 1326)***

In Re: Information on cutting of trees concealed and information on planting of saplings is suspicious [Paragraph 25 (aaa)-(ccc)]

226. The contents of paragraph 25(aaa)-(ccc) are denied. That the answering Respondent has a valid tree cutting permission dated 25.05.2011 from the Department of Forest & Wildlife under Section 9(3) of Delhi Preservation of Trees Act, 1994 for cutting 156 trees with the direction to deposit a sum of Rs. 43,68,000 as security deposit with refundable/ non-refundable component of Rs. 14000 per tree for ensuring compensatory plantation of 1560 saplings (ten times). As per the said permission, 780 trees were to be planted by the Department of Forest & Wildlife while the remaining 780 were to be planted by the answering Respondents.

227. The Department of Forest & Wildlife, Govt. of NCT had already planted 780 saplings at I.T.O. Chungi Part (6). It is submitted that the answering Respondent has applied for extension for plantation of trees since it could not plant trees as the project site is not available for plantation due to delay in the construction process due to litigation by the Appellant. However, the answering Respondent has complied with the conditions of the approval and paid requisite fees. In terms of condition (7) of the permission dated 25.05.2011, in case there is any inability of the answering Respondent to plant the 780 trees, the security deposited paid for compensatory afforestation will stand forfeited.

A True Typed Copy of the valid tree cutting permission dated 25.05.2011 from the Department of Forest & Wildlife under Section 9(3) of Delhi Preservation of Trees Act, 1994 is annexed herewith and marked as ***ANNEXURE R-26.***

(From Pg. 1327 to 1330)

It is further submitted that the Appellant's objections to the tree cutting permission are hopelessly time barred. The permission was granted in 2011 and the Appellant admittedly did not question it then and slept on its rights. Therefore, the Appellant has no right to raise such belated objections.

In Re: Setting precedent for other high-rise projects to be constructed in the area even though tall buildings area restricted [Paragraph 25(ddd)]

228. The contents of paragraph 25(ddd) are denied. It is extremely upsetting to not that the Appellant is relying upon a pre-independence letter from 1943 to buttress its submission that high-rise projects ought not to be permitted. The said letter has no legal force as the same was executed prior to the

coming into force of Constitution of India and hence has lost any legal sanctity in light of doctrine of eclipse. Further, in light of the fact the legal framework for the construction of the high rise project are now being carried out in compliance with the MPD-2021, the said letter holds no relevance to the facts of the present case.

229. In any case, it is reiterated that the Project does not fall within the controlled zone wherein height restrictions apply, as has been held by the Hon'ble High Court *vide* its Order dated 27.04.2015, which has been upheld by the Apex Court *vide* its Order and Judgment dated 17.12.2019.

230. The contents of Ground (A)-(HH) are denied *in toto*.

231. Therefore, in light of the above-mentioned grounds, the present Appeal deserves to be dismissed with exemplary costs.

FILED BY

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PLACE: NEW DELHI

DATE : 27.09.2021

BEFORE THE NATIONAL GREEN TRIBUNAL

(PRINCIPAL BENCH), NEW DELHI

(UNDER SECTION 16(B) OF THE NATIONAL GREEN TRIBUNAL 2010)

APPEAL NO. 17 OF 2021

IN THE MATTER OF:

University of Delhi ...Applicant

Versus

Ministry of Environment Forest & Climate Change & Ors. ...Respondent

AFFIDAVIT

I, Rajiv Ranjan Sharma son of Sh. B. Sharma aged about 54 years, Authorized Signatory Respondent No. 2 having office at 43, Babar Road, Bengali Market, New Delhi-110001, do hereby solemnly affirm and declare as under:

1. That I am the Authorized Signatory of the Respondent No. 2 herein amfully conversant of the facts and circumstances of the matter and am competent to swear this affidavit.

2. The contents of the accompanying Reply true and correct to the best of my knowledge and have been drafted by the counsel on my instructions and nothing materials has been concealed therefrom.

Identified by the deponent who is signed/put T. in my presence

DEPONENT

VERIFICATION:

27 SEP 2021

I, the above named deponent do hereby verify that the facts stated herein above are true to my knowledge and belief and no part of it is false and no material fact has been concealed therefrom.

Verified on this 27th day of September, 2021 at New Delhi.

NOTARY GOVT. OF INDIA NEELAM SHARMA ADVOCATE DELHI REGD. NO. 3227 EXPIRY DATE 01/09/2025

ATTESTED NOTARY (Govt. of India) Neelam Sharma Advocate Ch. No.165A, Gate No. No.11, Patiala House Courts, New Delhi-110001 M: 9899408301

27 SEP 2021

DEPONENT

NOIDA BUILDERS (P) LTD. NEW DELHI

ANNEXURE -R1

YBPL - List of Approvals / NOCs

	MoEF&CC / SEIAA	Environment Clearance (EC)	21.05.2021	23.03.2018		13.08.2012	
S.No.	Statutory Authority	Approval / NOC	Layout 4 + BP 4 (2020-2021)	Layout 3 + BP 3 (2019)	Layout 3 + BP 2 (2017-2018)	Layout 2 + BP 1 (2014-2016)	Layout 1 (2009-2013)
1	North DMC - 'Layout Scrutiny Committee' (LOSC)	Layout recommendation to SC	19.02/05.03.2020	01/02.06.2017		27.11/15.12.2014	16/24.02.2012
1A	North DMC - 'Standing Committee' (SC)	Layout Plan	19.08/18.09.2020	17.11.2017		08.07.2015	22.03/11.04.2013
2	North DMC - Building Plan (BP)	Building Plan	23/24.07.2021	26/31.07.2019	Rejected on 10.04.2018. CWP filed but withdrawn after Service Plans made mandatory for BP sanction	Layout & BP redundant after introduction of UBBL 2016. Fresh Layout submitted	BP not submitted due to change in Density norms. Fresh Layout submitted
3	Delhi Jal Board (DJB)	Service Plans (Water & Sewerage)	05.06.2021	09.07.2019	Not required for BP sanction	07.10.2015, 11.01.2016	Not required for Layout sanction
4	North DMC	Storm Water	24.11.2015				
5	Delhi Fire Service (DFS)	Fire Safety	12.07.2021	12.07.2019	08.09.2017	13.01.2015 (Layout) 15.01.2016 (BP)	13.03.2012 06.02.2013
6	Delhi Urban Art Commission (DUAC)	Urban Art & Design	08/17.07.2021	11/16.07.2019	16.08.2017	13.02/05.03.2015 (Layout) 11.02/02.03.2016 (BP)	19.12.2012 / 28.01.2013
7	Delhi Pollution Control Committee	Consent to Establish (CTE)	Not issuing to residential complexes in compliance of Hon'ble Delhi High Court Order Judgment dated 23.01.2012			15.01.2013	
8	Airport Authority of India (AAI)	Height	Not required as per colour coded map of AAI			16.04.2009 28.06.2011	
9	Department of Forest & Wild Life	Tree removal / transplant	25.05.2011				
10	Archaeological Survey of India (ASI)	Centrally Protected Monuments	08.05.2009				
11	National Monument Authority (NMA)	Centrally Protected Monuments	26.12.2012				
12	Tata Power Delhi Distribution Ltd. (TPDPL)		14.08.2013				

Joint Inspection Report

on

Proposed High- rise Residential development by DMRC near Vishwavidyalaya Metro Station viz-a-viz Delhi University, North Campus



March 2010

Contd.

Joint Inspection Report

on

Proposed High- rise Residential development at Mall Road, near Vishwavidyalaya Metro Station viz-a-viz Delhi University, North Campus

1.0 Introduction:

1.1 In the *'Authority'* meeting chaired by Hon'ble Lt. Governor on 17.2.2010 at Raj Niwas, it was observed by some of the members that the proposed high-rise development near Vishwavidyalaya metro station would be discordant to the adjoining Delhi University, North Campus. Specific objections were voiced regarding nearby Girls hostel being overlooked by the occupants of high-rise apartments proposed by DMRC. Parking problems were also feared.

1.2 Hon'ble L.G. asked for a joint inspection report of the site.

1.3 Accordingly, a site inspection was conducted by Sh. V.K. Bugga, Chief Town Planner, MCD and Sh. S. Jethwani, Chief Engineer, DMRC on 19.2.2010 at 09.30A.M. Sh. A.K. Bajaj, EM/DDA could not join this inspection.

2.0 Facts:

2.1 The proposed *'site'* 3.05 Ha. Viz. a viz. Delhi University North Campus is shown in the *Google* picture (Ann.-1)

2.2 The *'site'* is outside the Delhi University/North Campus area. (Ann. 2 Layout Plan of North Campus, Delhi University)

2.3 The proposed *'site'* is not a part of Civil Lines Bungalow Zone.

2.4 MRTS station is operational there since 20.12.2004.

2.5 The landuse of the *'site'* has been changed from 'Public/Semi-Public' to 'Residential' following the scheduled process of informing public through press notice, hearing objections thereof and Authority's approval, culminating to Notification dtd 23.9.05 (Ann-3.)

2.6 This change of land use has been incorporated in Draft Zonal Dev. Plan for Zone – 'C', approved by 'Authority' (Ann. 4)

2.7 Height control for group housing has been removed in MPD2021 (Para 20d 'Shelter) for optimal utilisation of land and to facilitate creating of 'signature projects'.

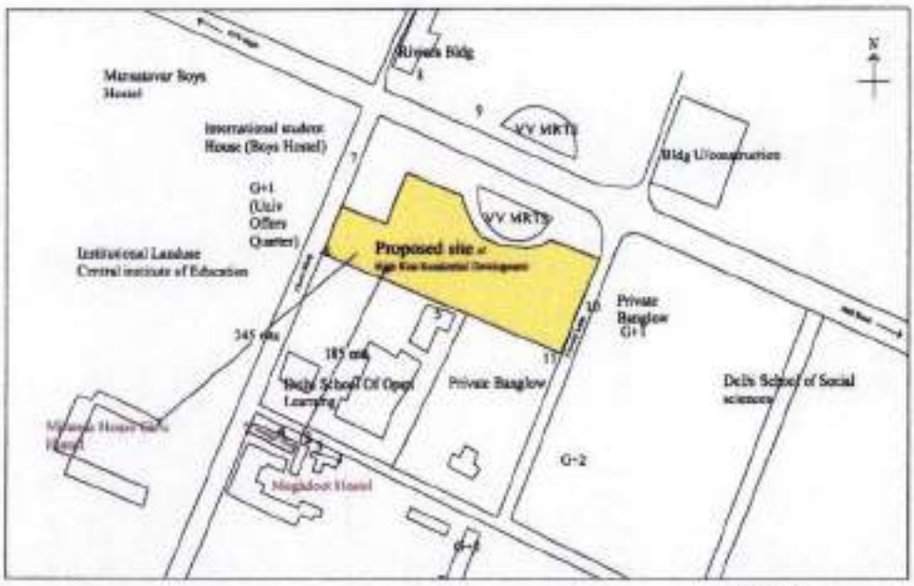
2.8 No Objection for height upto 101.65 mts. Has been Issued by Airport Authority of India for the proposed *'site'*. (Ann.5).

2.9 ASI have also issued NOC for the project (Ann.6)

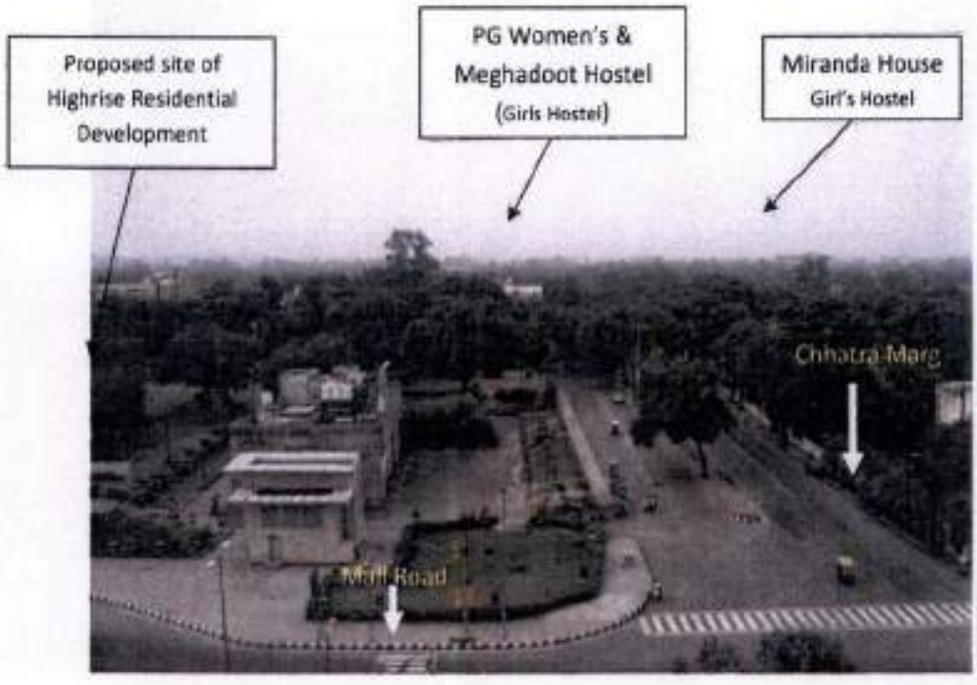
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3.0 **Site observations**:

3.1 Miranda House Girls Hostel is at a distance of (approx) 250mtrs. towards South-West of the proposed site, shown in drawing below:-



3.2 There is a thick foliage / tree cover around the buildings. As would be observed from the photograph, taken from a height



Contd.

3.3 Miranda House is completely shrouded by the trees cover as shown in the photograph below.

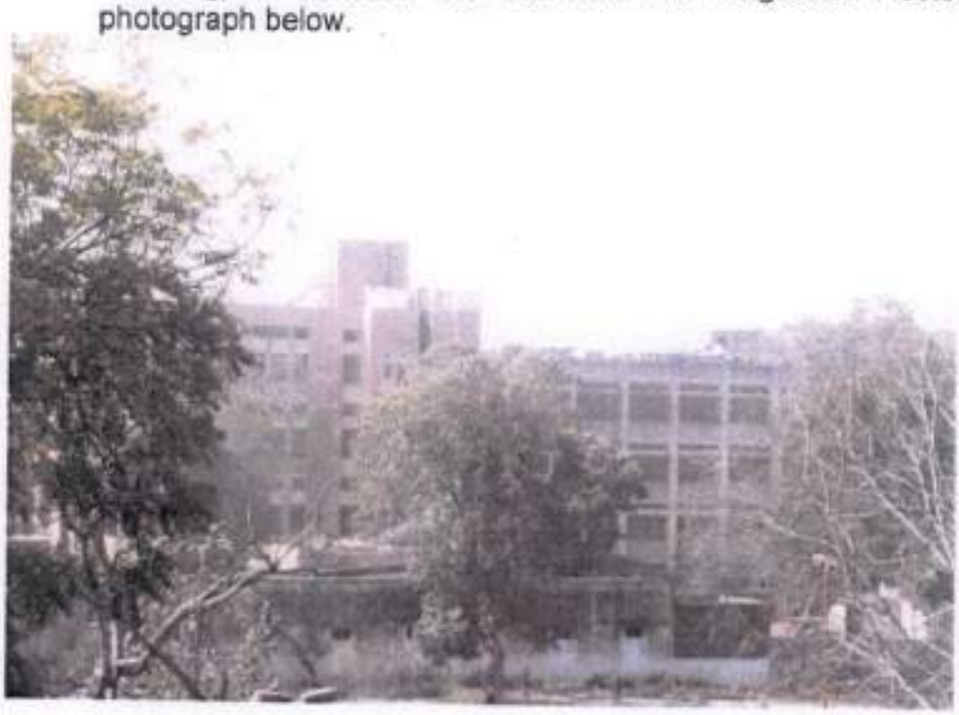


3.4 The same is true about P.G. Women Hostel, Meghdoot Hostel.

3.5 On the Northern side of these hostels (i.e. the face opposite the proposed site) there is a blank wall or windows with high sill level as shown in the photograph below.



3.6 Also there is an institutional building (G+3),(School of Open Learning) in between the site and the Meghdoot Hostel, photograph below.



3.7 On the other side of the Mall Road, there is a multi-storeyed (8 storeys) apartment building as shown in the photograph below.



Contd.

3.8 Another multi-storey building is under construction there.



3.9 Ample parking for metro commuters has been provided on both sides of Vishwavidyalay metro station. Further, it has potential for development as Multi-level car park, if required.



3.10 No spillage of cars was observed on the roads around viz. Chatra Marg, Cavalary lane etc.



4.0 Discussion:

4.1 The site visit has revealed that thick foliage cover completely screens the girls' hostel buildings, affording privacy.

4.2 Height also does not provide a vantage position to intrude into the privacy, as seen in the photo taken from height.(Ref. 3.2) In fact, the higher one goes the visibility suffers more. Due to haze around, even the binocular vision does not help to see any object clearly at ground/low rise buildings level.

4.4 'High rise' phenomena is on the rise because it not only adds beauty to metropolis, it is solution for the rising populace.

4.5 MPD2021 also has done away with the height restriction for group housing as a major highlight and while doing so it states that this is also to facilitate creation of 'signature' projects.

4.6 Close to this site (on another DMRC site), a multi-storied group housing has been approved at Khyberpass, recently.

4.7 The proposed buildings by DMRC are aimed at producing iconic development, as an island of excellence, inspiring improvements around.

4.8 For Academic & Administrative buildings MPD 2021 allows 10 to 12 storeys/ upto 37mtr. height (Table 13.6: Development controls for Educational Facility: Higher Education).
Residential development in university area shall be regulated as per Group Hosing norms (Table no. 13.6), which inter-alia allows greater FAR with no height restriction applicable.
This would encourage high-rise construction as a part of redevelopment plans for optimal land utilisation, for catering to growing demands within the campus; retaining open & green spaces.

4.9 Any attempt to restrict the height of buildings would result in more Ground coverage, resulting in sacrificing of open and green spaces/ cutting of more number of trees, full grown and very old trees; it is therefore not desirable.

4.10 Complete parking for the proposed residential development required as per MPD norms viz. 924 ECS, has been planned at site itself in the form of multiple basements/stilt space. Parking problem will not at all aggravate due to this development.

4.11 The work will be taken up only after sanction of Plans including approvals from regulatory/statutory authorities DUAC/CFO/ASI Min. of Environment etc.

Contd.

5.0 Concluding remarks:

From the facts and discussions thereof, given above, it is apparent that:

5.1 Proposed development will not affect the privacy of the Girls/women hostel nearby, as these are either far (e.g.Miranda House) or interspersed by other buildings (i.e.Meghdoot Hostel) and are covered by greenery etc.

5.2 High-rise construction in this area is not debarred in MPD and it will also not adversely affect the girls hostels in the campus.

5.3 Only 146 no. saleable units/flats planned are not expected to result in exceeding density as per MPD for that area. Full provision as per MPD, will not add to parking problem.

5.4 The nature of development proposed by DMRC in the form of a small no. of exclusive, elegant and spacious apartments, with all amenities including landscaping and beautification of the site, may not affect the serenity / tranquility of university area.

5.5 Iconic development proposed on this site may rather improve the impression at the Gateway to university area, though the urban design is to be seen and approved by DDAC etc.

(S. Jethwani)
CE/PD

(V.K. Bugga)
CTP/MCD

(A.K. Bajaj)
EM/DDA

ANNEXURE -R3

REPORT

The meeting of the Sub-Committee, constituted by SEAC vide letter nos. DPCC/MS/SEAC/10/2230-2240 dated 13.12.2011 and DPCC/MS/SEAC/10/2249-2260 dated 22.12.2011, was held on 24/01/2012 in the Office of Chief Vigilance Officer, Room No. 121, 1st Floor, Delhi Jal Board, Varunalaya, Phase – IInd, Karol Bagh, New Delhi - 110005. Following members of the Sub-Committee were present in the meeting:

1.	Shri Chinmaya R. Gharekhan	-	Member
2.	Dr. A. K. Ambasht	-	Member
3.	Prof. Subir Saha	-	Member
4.	Dr. (Mrs.) P. Malarvizhi	-	Member
5.	Dr. Anil Kumar	-	Member

Dr. Chetna (Scientist, Environment) assisted the Sub-Committee.

The Sub-Committee had point-wise discussion on the issues as raised by Registrar, Delhi University vide his letter no. SPA/R/2011/R-3314 dated 25.10.2011 and recorded statements/replies/submissions as mentioned below from both sides viz., Delhi University and M/s Young Builders Pvt. Ltd. The committee again met on 09.02.2012 and discussed the matter to finalise the conclusion based on meeting dated 24.01.2012 and site visit dated 02.02.2012.

1) DUAC Clearance

Delhi University: Delhi University stated that the project proponent has not approached DUAC for the said project and came straightway to SEAC. Also stated that as per their own experience, DUAC approval is first and then EC is to be obtained from SEAC and the same has also been sought by SEAC vide its minutes of 10th meeting held on 04.09.2009.

M/s Young Builders Pvt. Ltd.: DUAC considers only after the Environmental Clearance has been obtained and MCD sends the proposal directly to DUAC. Project proponent informed that they have applied to MCD.

Sub-Committee Recommendation/Observation: DUAC and SEAC are independent bodies. As per present scenario, Environmental Clearance has to be sought first which also is a pre-requisite to MCD before sanctioning of the building plans. Hence there is no irregularity if M/s Young Builders Pvt. Ltd. has approached SEAC first and since EC is pre requisite for plan sanction, the SEAC has rightly not insisted for the DUAC clearance after the meeting dated 04.09.2009 as evident from the different minutes of SEAC.

2) Ecology and Social Environment

Delhi University: The Registrar of Delhi University requested the Sub-Committee to have a site visit to see the present existing usage of the University area. He showed the Master Plan of Delhi University and pointed out that the project site is at the mouth of the entrance of the University through the Chhatra Marg which is being used by large number of students (about 1 Lakh), teachers, staff, residents of hostels/staff quarters etc. alongwith movement of vehicles, making the road mostly congested. Alongside the Chhatra Marg, there are women hostels, residential areas, Miranda House, School of Open Learning (where over 2.5 lakhs of students come on weekends), VC bungalow etc. The other parallel road is the Cavalry Lane, which is used for entrance for stadium and also for School of Open Learning.

He further said that Delhi University has sent a proposal to the Office of Chief Minister of Delhi to block the Chhatra Marg and allow only pedestrian movement for students and University staff,. Registrar also stated that UTTIPEC in

September 2010 has approved for one way traffic flow on this road, however same has not been implemented yet.

The representatives of Delhi University also stated that the proposed high-rise building will expose the privacy of nearby buildings particularly the women's hostel. Presently, the highest building in the area is G+8 floors. They also said that considering the traffic load on the Chhattra Marg, the said site should have been allocated for parking area to the University and Metro buses instead of such a high rise building of 35 floors for residential purpose. They also stated that the present civic infrastructure of the area is already overused and poor and during monsoon season the water logging on the road is at the waist level. It was also pointed out that the proposed project has environmental, social, cultural and infrastructural impact apart from impact on future expansion of Delhi University and the constriction of high rise building will not go well with the surroundings and it fact the land should have been offered first to the university.

M/s Young Builders Pvt. Ltd.: The representatives of M/s Young Builders Pvt. Ltd. stated that the entry of the said site is from the Cavalry Lane and the Chhatra Marg is not to be used at any time. They also stated that a 16 hr traffic load survey of Chhattra Marg has been done on 21.07.2011.As per the survey, the capacity of 12 m wide Cavalry Lane is of 1285 PCUs (passenger car units) and the movement of vehicles through the road during weekdays is of 1844 PCUs, which rise to 2000 PCUs during critical hours. (The survey was based on IRC:106-1990 as per which the design service volume is 70% of the traffic volume.). Even after the operation of the said project, maximum loading will be of 626 PCUs which is far less than the carrying capacity of the road. The said project will only contribute maximum of 192 Cars (2 cars per apartment).

Moreover as per DDA policy, residential sites are encouraged to be located near the Metro stations so as to cater the traffic load through use of public transport.

The representatives of M/s Young Builders Pvt. Ltd. also stated that the end use of the project will be residential and the building is outside the periphery of the Delhi University. It was also pointed out that the Delhi University will also have to go vertically for future developments to meet the expansion and the process has already be given. The proposed high rise building has been taken up so as to create lot of green spaces by consuming less space for the towers horizontally. It was clarified by them that the face of the women's hostel of the Delhi University is on the other side and the residents of the high rise building will also be used by the families which will not be any threat to the privacy of the women's hostel or nearby residential buildings. Further the plot has been purchased through open auction and all activities being carried out strictly as per law and Delhi University can not infringe their rights .

Sub-Committee Recommendation/Observation: The Sub-Committee asked the representatives of Delhi University to give the status of the proposal regarding blocking of the Chhattra Marg besides copy of the approval issued by UTTIPEC which may be looked into by SEAC however the same has no relation with the present project as they are not using Chhatra Marg.. Since the Young Builder is not using the Chhatra Marg and Cavalry Lane has sufficient capacity for the project traffic. the apprehension of the university seems to be not correct. Further the development being residential is not a problem for the privacy as apprehended by the Delhi University. The same has also been confirmed by the Chief Town Planner in their report of the Committee constituted by Hon' L.G. However for infrastructural load except for traffic load, the SEAC committee may assess the same while carrying out appraisal. Delhi University can not interfere with the rights of M/s Young Builders Pvt. Ltd. over the use of land for legal development. Delhi University has so far not given any proposal to MCD, which is the competent authority for deciding the issue.

3) Change in Land Use of the project site

View of Delhi University: Registrar informed that the Committee appointed by the Lt. Governor never contacted with the representatives of Delhi University and Delhi University was not aware of the Change of the land use from PSP to residential and auctioning of the Land by DMRC and also about the Hon'ble High Court's Order with respect to said project. He further stated that they got the information only when the project proponent cut about 150 trees at the site. He informed that DU had been sending its representation to concerned authorities but got no reply from them, however they never approached DDA or Urban Development Department regarding change of land use. Also representatives stressed that Tree cutting permission should have been prior to the grant of Environmental clearance..

Registrar also stated that the land is a leased property given to MOUD/Metro by Ministry of Defence for PSP utilization which thereafter was leased out to DMRC for metro purpose. He objected that no objection had been sought from Ministry of Defence, while giving lease to Young Builders for the residential use from PSP.

Delhi University representatives also sought copies of response of the proponent to the Registrar representation.

M/s Young Builders Pvt. Ltd.: The representatives of M/s Young Builders Pvt. Ltd. stated that the land originally belonged to Ministry of Defence, which granted No Objection in favour of DMRC vide letter no. 13015/2/D(Lands)/2000 dated 02.05.2000. It was then acquired by the Land Acquisition Collector/ADM, District North vide Award No. 7/DC/N/2001-2002 dated 06.09.2001 for the purpose of giving it to DMRC. This land was mutated in favour of DMRC as per Form No. 10/Jamabandi Nakal dated 08.12.2004 and 15.12.2004. MOUD vide their notification no. S.O. 1383(E) dated 23.09.2005 changed the land use for 3.05 Ha. from 'Public and Semi Public (PSP) Facility' to 'Residential'. DDA vide letter no.

F20(2)/2000/MP/Pt.IV/D-328 dated 14.09.2007 informed DMRC that the FAR permissible for this plot would be 200 and that development control norms prescribed for residential plot-group housing in MPD 2021 would be applicable. DMRC vide RFP document No. DMRC/PD/VV/JUNE-08 invited bids for this site in June 2008. Young Builders Pvt. Ltd. bid for 2.0 Ha was accepted by DMRC vide LOA No. DMRC/PD/LINE2/VV/215 dated 13.08.2008. The vacant possession of 2.0 Ha was handed over to Young Builders Pvt. Ltd. on 23.01.2009.

The order No. K-14011/8/2000-MRTS dated 30.03.2009 issued by MOUD states that 'DMRC is also authorized to lease / sub-lease / licence / concession the land for raising revenue from property development'.

Further, the trees of the site have been cut with the prior permission of Forest Department issued vide No. F.8(46)/COT/NFD/08-09/96-97 dated 03.05.2011.

The Committee appointed by Lt. Governor had 7-8 meetings before the report was given and hearing was neither given to M/s Young Builders Pvt. Ltd. nor the university

Sub-Committee Recommendation/Observation: The Sub-Committee noticed that project proponent had not violated land use notification issued by MOUD vide no. S.O.1383(E) dated 23.09.2005. Further after examining the documents submitted by proponent as contained in the Case file, there is no need of NOC from Ministry of Defence as the land had been mutated in the name of DMRC from Ministry of Defence. The Sub-Committee also observed that the Delhi University did not even raised objections in 2005 when the notification of Change in land use was done. Delhi University may approach SEAC for obtaining the copy of reply given by the project proponent against their representation. The trees have been cut with the prior permission however SEAC may direct forest department not to give tree cutting permission if case is within the ambit of EC.

4) Seismic Threat

Delhi University: There is a seismic threat in the area as there is already an underground metro station and this project also proposed to have two basements.

M/s Young Builders Pvt. Ltd.: The fears of the seismic threat are baseless. The building will be constructed with due consideration of seismic threat and remedial measures. A detailed Geotechnical Investigation Report including seismic details is already submitted to SEAC.

Sub-Committee Recommendation/Observation: The Sub-committee observed that the issue of seismic threat raised by DU is not substantiated by facts or figures/data. Entire Delhi region falls under Seismic IV Zone. Building's structural design/technical details may be looked into by concerned sanctioning authorities i.e. MCD, DUAC and SEAC.

Site visit:

To ascertain the ground reality of said project site, Sub-Committee visited the site on 02/02/2012 from 9.30 A.M. to 11.00 A.M. Following members of the Sub-Committee were present at the site visit:

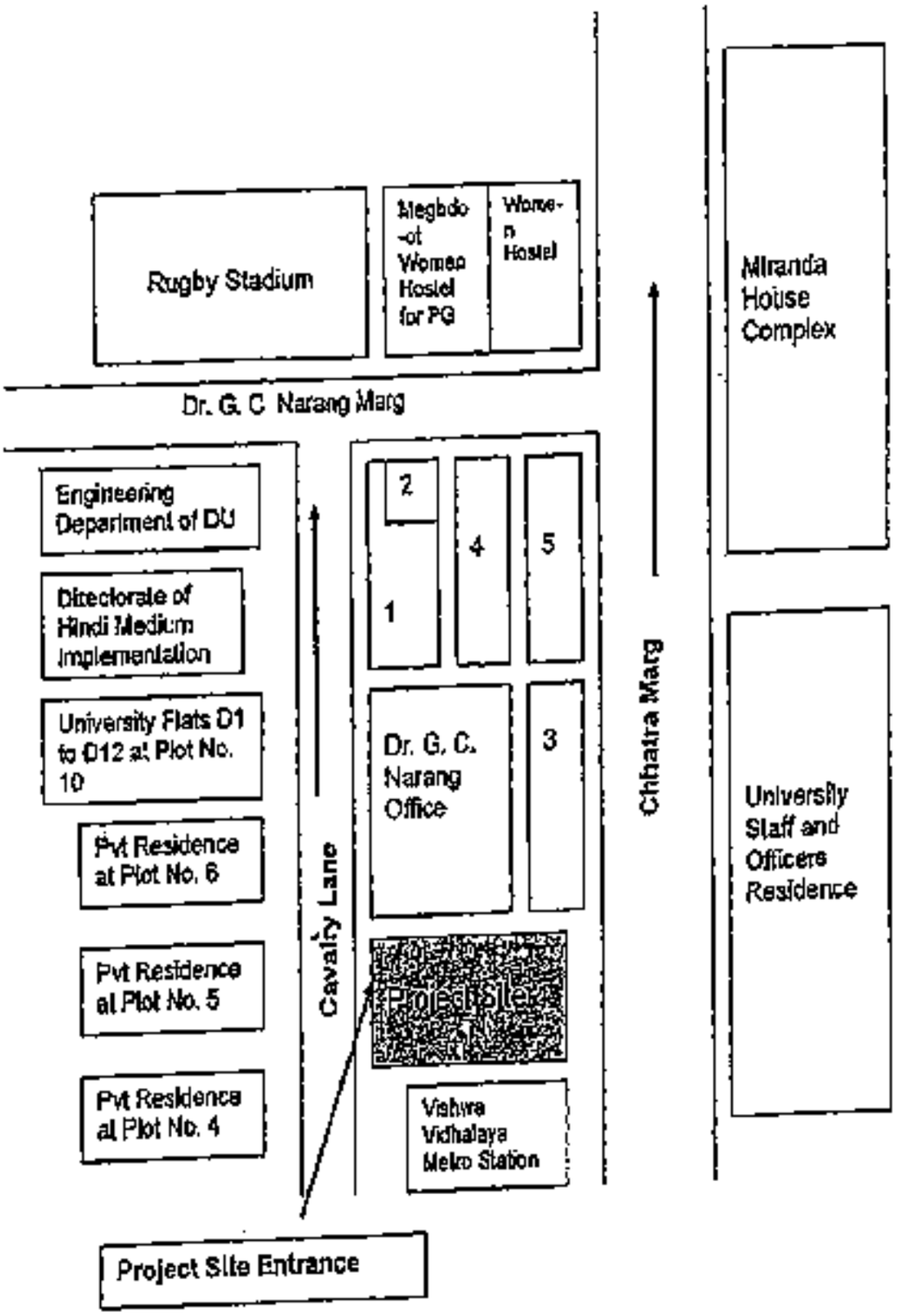
1. Dr. A. K. Ambasht - Member
2. Prof. Subir Saha - Member
3. Dr. (Mrs.) P. Malarvizhi - Member
4. Dr. Anil Kumar - Member

Shri Chinmaya R. Gharekhan had already visited the site on 24/01/2012.

The Sub-Committee took a complete round of the area around the project site and noticed nearby buildings. The project site is adjacent to Vishwa Vidhalaya Metro Station and is in between the Cavalry Lane and Chhatra Marg.

<u>The rough sketch of the plot indicating nearby existing buildings, as observed by the Sub-Committee is as below:</u>

1 – Dr. G. C. Nerang Residence; 2 – Santosh Cottage; 3 – VC residence; 4 – School of Open Learning and 5 – Gandhi Bhawan – Delhi State Legal Services Authority



Observation:

During the site visit, following observations were made by the Sub-Committee members:

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* **IN THE HIGH COURT OF DELHI AT NEW DELHI**

% *Judgment delivered on: 27th April,2015*

\+ **W.P.(C) 2743/2012**

REGISTRAR, UNIVERSITY OF DELHI ..... Petitioner
Represented by: Mr. V.P. Singh, Sr. Adv. with Mr. Ankur Chibber and Mr. Prashant Sivarajan, Advs.

versus

UNION OF INDIA AND ORS ..... Respondents
Represented by: Mr. Sandeep Sethi, Sr. Adv. with Mr. Prashant Mehta and Mr. Himanshu Kapoor, Advs. for R12.
Mr. Arun Birbal and Mr. Sanjay Singh, Advs. for DDA.
Mr.Sushil Kr. Tripathi, Adv. / Proxy Counsel for Ms. Anita Pandey, Adv. for R7 to R9.
Mr. Tarun Joshi, Adv. for DMRC with Mr. A.S. Rao, Law Officer from DMRC.

CORAM:
HON'BLE MR. JUSTICE SURESH KAIT

SURESH KAIT, J.

1. Vide the present petition, the petitioner University prayed, inter alia, as under:-

a. Issue a writ of certiorari in favour of the petitioner and against the respondents thereby quashing / setting

aside the impugned decision taken by the respondent no. 3, i.e., DDA in its meeting held on 12th May, 2011, wherein the respondent no. 3 while acting contrary to the mandate of the Master Plan Delhi – 2021 and the development control norms for metro stations as stipulated under chapter 12 of the Master Plan Delhi – 2021 has so allowed the respondent no. 12, i.e., M/s. Young Builders (P) Limited to construct a high rise multi-storey group housing society in the control zone of Zone-C and has further by virtue of the impugned decision has been pleased to allow development control norms as available to any group housing under MPD-2021, including a FAR of 200 and maximum ground coverage of 33.3%, without any height restrictions and has further allowed the plot leased out of the Respondent no. 12 by the Delhi Metro Rail Corporation, i.e., Respondent 10, i.e., plot admeasuring 2 Hectares as a separate entity segregating it from the total land acquired for metro station i.e., 3 Hectares and has further been pleased to allow development controls as applicable under the clause "Group Housing" as per the provisions of MPD-2021 to the segregated 2 Hectares plot, which act of Respondent no. 3 is against the mandate of law

and more so is in totally ignorance of the MPD-2021, Zonal Plan of Zone 'C' & the provisions of the Delhi building By-Laws.

b. Issue a writ of mandamus in favour of the petitioner and against the respondents thereby directing the respondents to follow the mandate of the Master Plan of Delhi – 2021 and in more particularly the development control norms as contained in the Gazette Notification dated 20th January, 2005 (incorporated under Chapter-12 of the Master Plan of Delhi – 2021) relating to Zone-C;

2. Facts of the case, in brief, are that in March, 2000 Delhi Metro Rail Corporation Ltd.(hereinafter referred to as DMRC) wanted to acquire land for its Metro Station, i.e., Vishwavidyalaya Metro Station falling under Zone-C of MPD 2021 and for the said purpose identified various bungalows for acquisition. On 02.05.2000 Ministry of Urban Development granted it's no objection for the acquisition of the bungalows. The land use of the proposed land to be acquired was changed from 'residential' to 'public purpose'. Accordingly, notification under section 4(1) of the Land Acquisition Act, 1984 was issued on 15.12.2000. A declaration was made under section 6 of the Land Acquisition Act, 1984 on 14.02.2001. Consequently, the Land Acquisition Collector passed an award on 11.09.2001 and land

measuring 3.05 Hectares situated in Zone-C (Civil Lines Zone) at Mall Road was duly handed over and mutated in the revenue records in favour of the respondent No.10 DMRC.

3. Thereafter, on 21/23.07.2003 Ministry of Urban Development and Poverty Alleviation granted approval to permit the respondent No.10 / DMRC to generate resources through property development within the period of 6 to 20 years. Respondent No.3, Delhi Development Authority (hereinafter referred to as DDA) issued a notification No.500(E) on 16.04.2004 in accordance with the provisions of section 44 of the Delhi Development Act, 1946 (hereinafter referred to as DD Act) inviting objections/suggestions on the modification proposed by the Central Government with a view to modify MPD 2021. On 20.01.2005 land use provisions of Master Plan Zonal Development Metro Stations along with Property Development with Control Norms was notified by virtue of a Gazette notification. On 23.09.2005, Government of India notified change in land use from 'public and semi-public' to 'residential'.

4. Accordingly, on 12.02.2007 DDA informed DMRC that in view of the change of land use, the MPD and the Zonal Development Plan Zone-C providing detailed guidelines for development might be followed. On 07.02.2007 MPD 2021, inter alia, stipulating Development Controls for Metro Stations was notified. On 29.03.2007 and 14.09.2007 DDA confirmed to DMRC that all statutory provisions

relating to group housing as per MPD 2021 were to be followed. In June, 2008 DMRC issued 'Request for Proposal' for residential development at Vishwavidyalaya Metro Station indicating that norms of residential plot group housing as per MPD 2021 were to be followed., i.e., FAR of 200, ground coverage of 33.3% and its intention to transfer leasehold rights to the developer for a period of 90 years.

5. Accordingly, a bid of respondent no.12 Young Builders was approved by the competent authority, thereafter letter of acceptance was issued. A lease deed was executed and possession was handed over. Thereafter, respondent No.12 submitted its application to the Municipal Corporation of Delhi (hereinafter referred to as MCD) along with the proposed layout plan for the approval of the Group Housing Scheme. Accordingly, on 08.06.2009 MCD sought clarification from DDA about the control norms.

6. Thereafter, the petitioner submitted a detailed representation to the Delhi Urban Arts Commission (hereinafter referred to as DUAC) raising concerns about the project. On 05.08.2009 the Chairman DUAC wrote to the DDA to reconsider the project, as requested by the petitioner. Accordingly, on 19.08.2009 DDA withdrew its earlier letters dated 29.03.2007 & 14.09.2007 recording that the development control norms of the property development for the Metro Station dated 20.01.2005 would be applicable. Accordingly, on 06.05.2010 the petitioner approached this Court by WP(C) 3135/2010 challenging the

notification dated 20.01.2005 seeking quashing of the letter dated 19.08.2009 issued by DDA. The said petition was disposed of without adjudication on merit on the basis of the meeting held on 12.05.2011.

7. Mr. V.P Singh, Learned Senior Counsel appearing on behalf of the petitioner submitted that the act of the DDA would be in direct conflict with the purpose of acquisition and would severely affect the norms and aesthetic beauty of North Campus of Delhi University which houses historical buildings, colleges, viceroy lodge etc. The plot was acquired for the purpose of Mass Rapid Transit System (MRTS) after converting the original land use of the land from 'residential' to 'public and semi-public facilities'. As per the Regulation 8(3) of MPD 2021 specifying the Regulations of Building Controls within Use Premises, it is specified as under:-

> *" The objective of these regulations is to provide controls for building (s) within use premises excluding the internal arrangement, which are covered in Building Bye-laws.*
> *1. Where development controls are not stipulated for any use premise, the same can be formulated by the Authority.*
> *2. The mezzanine floor and service floor wherever provided shall be considered as a part of the total FAR.*
> *3. If the building is constructed with.....*
> *4. Wherever the building regulations are given for different categories of plots, the area covered and the floor area shall in no case be less than the permissible covered area ad floor area respectively for the largest size of plot in the lower category."*

8. In view of the above, the respondent could have altered the conditions in respect of use of the premise only when no development controls were stipulated for the same. However, the same is not applicable in the instant case as the control norms have been formulated in respect of Metro Stations. Moreover, as per clause 2 (7) of the Development Code contained in MPD 2021, the definition of 'use premises' is given as *"Use premises means one of the many subdivisions of a Use Zone, designated in an approved layout plan, for a specific use. Land use of a premise has to be determined on the basis of an approved layout plan."*

9. Learned Senior Counsel further submitted that the MPD 2021 itself stipulates certain development controls for Metro Stations, and the same is given as under:

> *"Development Controls for Metro Stations:*
> *1. Metro stations along with property development (composite development) up to a maximum area of 3.0 ha shall be permitted in all Use Zones, except in Recreational and Regional Park / Ridge Use Zone. Lutyens' Bungalow Zone and Heritage Zones.*
> *2. This enabling provision of property development would have the following broad development controls:*
> *i. 25% ground coverage and 100 FAR, including area under Metro Station with no height restrictions and subject to approval of the statutory bodies such as ASI, Airport Authority, DUAC etc.*

ii. In addition to the requirement of parking for Metro stations, parking for the commercial component will be @ 2 ECS per 100 Sq.m.
iii. The development shall be undertaken in a composite manner and DMRC shall obtain approval of all the concerned local bodies / agencies.
3. The following structures shall be treated as operational structures:
i. All Metro Stations and tracks supporting at grade, elevated and underground including entry structures, ancillary buildings to house DG sets, chilling plants and electric substation, supply exhaust and tunnel ventilation shafts etc.
ii. Depots and maintenance workshops.
iii. Traction substations.
iv. Operational control centres.
v. Police Station.
vi. Recruitment and training centres for operational and maintenance staff.
vii. Housing for operational staff and Metro security personnel only.
viii. Rehabilitation work to be undertaken for the construction of Metro project.
ix. Shops in Metro stations to cater to the public amenities.
x. Structure above platform over the footprint for the Metro Stations."

10. Learned Senior Counsel submitted that it was incumbent upon the DDA to follow the development control norms as stipulated above and by taking the impugned decision; the same could not have been negated / circumvented. The site for proposed construction being in a Metro Station premises, the Respondents were bound to follow the norms specified in clause 2 (i) above i.e., 25% ground coverage and

100 FAR. Moreover, clause 11.3 of MPD 2021 imposes a restriction on the height of tall buildings as under:-

> *"The height of buildings (above and below ground) needs to be seen in the light of modern technology with due consideration for natural disasters like earthquakes, floods etc.*
> *Restrictions on tall buildings would be necessary in important areas like Lutyen's Bungalow Zone, Civil Lines and North Delhi Campus. In case of urban extension, areas for specific Urban Design projects and tall buildings should be identified."*

11. Mr. V.P. Singh further submitted that Para 1.4.4 of the Zonal Development Plan for Zone-C (Civil Lines) under MPD 2021 provides as under:

> *"The Delhi University was established in 1924 and it has a number of old historical buildings, colleges, Viceroy's lodge etc. of the Colonial period and therefore efforts shall be done to preserve this character. Also, efforts shall be done to make it an Integrated Campus (without thoroughfare) and self sufficient in terms of modern infrastructure and residential requirements like hostels, staff quarters, security arrangements etc. by optimum utilization of the land. Attempt shall be made to accommodate all institutional requirements within the Campus. Therefore an Urban Design study shall be taken up for this Sub-Zone. MPD-2021 has restricted this area for tall buildings.*
> *Delhi University has a large chunk of land allotted in Sub-Zone C-15, (opposite Dushehra Ground) and it is being utilized as Hostel and staff quarters. Optimum utilization of this land shall be done to meet the requirements in future.*

Listed Heritage buildings, some residences and Colleges of historical importance prepared by DDA, INTACH, ASI and GNCTD are given."

12. It was submitted that the respondents ought to have kept even this aspect in mind before issuing the impugned decision, especially considering the height restrictions imposed but the same has been ignored in the instant case. As essayed above, the MPD 2021 itself imposes a restriction for construction of tall buildings in the controlled zone of Delhi University. The impugned decision is in direct conflict with the MPD 2021 which is statutory in nature. Gazette notification dated 20.01.2005 is statutory in nature and provides for development control norms in respect of Metro station along with property development upto a maximum of 3 Hectares clearly stipulates 25% ground coverage and 100 FAR.

13. Further submitted that as per the RPF issued by DDA, the plot cannot be segregated and the area under the Metro Station cannot be excluded from the FAR available for the whole plot admeasuring 3 Hectare, as has been done in the instant case by the respondents. The actions of DMRC are in direct contravention with the permission sanctioned by the Ministry of Urban Development and Poverty Alleviation vide letters dated 22.07.2003 and 23.07.2003. By virtue of the impugned decision, the DDA has sought to virtually amend the provisions of MPD 2021.

14. Learned Senior Counsel submitted that the impugned decision is

a non-speaking order. Moreover, the decision taken was confined to the plot in question and that too with specific reference to Respondent No. 12 M/s. Young Builders. The relevant portion states: "…..... the 2 hectares of the plot leased out to M/s. Young Builders Pvt. Ltd. may be considered as a separate entity and the Development Controls as applicable under the clause Group Housing as per the provision of MPD 2021 be allowed……." The decision is applicable to this particular site only." It is further submitted that it is perplexing as to why DDA has found it fit to relax the norms applicable specifically to Respondent No. 12 and with reference to a particular site. Therefore, even if DDA wanted to relax the applicability of MPD 2021, it would amount to land use pertaining to a Zonal Development Plan and not lay out plan and the same could only be done after following the procedure prescribed in Section 11A of the Delhi Development Act, 1957.

15. To strengthen the above arguments, learned Senior Counsel has relied upon the case of ***Subramaniam Swamy & Ors. vs. Raju through Member, Juvenile Justice Board & Anr.*** **2014 (8) SCC 390** in which the Apex Court in Para 61 has held as under:-

> *"61. Reading down the provisions of a statute cannot be resorted to when the meaning thereof is plain and unambiguous and the legislative intent is clear. The fundamental principle of the "reading down" doctrine can be summarized as follows. Courts must read the legislation literally in the first instance. If on such reading and understanding the vice of unconstitutionality is attracted, the courts must explore*

> *whether there has been an unintended legislative omission. If such an intendment can be reasonably implied without undertaking what, unmistakably, would be a legislative exercise, the Act may be read down to save it from unconstitutionality. The above is a fairly well established and well accepted principle of interpretation which having been reiterated by the Supreme Court time and again would obviate the necessity of any recall of the huge number of precedents available except, perhaps, the view of Sawant, J. (majority view) in Delhi Transport Corporation v. D.T.C. Mazdoor Congress and others, 1991 Supp. (1) SCC 600."*

16. Further submitted that when the Statute and MPD have clearly specified Development control norms to be followed in the construction of Metro Station as well as construction in Zone-C as per Zonal Plan, it is not open to the respondents to circumvent the same through administrative action and other means. The respondents have failed to appreciate that once a land has been acquired for a particular purpose, the same cannot be converted to some other purpose as has been held by the Apex Court in the case of ***Bangalore Medical Trust vs. B.S. Muddappa &Ors. , 1991 (4) SCC 54*** wherein it was held as under:-

> *"…… This means that once an area has been stamped with the character of a particular civic amenity by reservation of that area for such purpose, it cannot be diverted to any other use even when it is transferred to another party. The rationale of this restriction is that the scheme once sanctioned by the Government must operate universally and the areas allocated for*

> *particular objects must not be diverted to other objects. This means that a site for a school or hospital or any other civic amenity must remain reserved for that purpose, although the site itself may change hands."*

17. Learned Senior Counsel submitted that because the respondents have miserably failed to appreciate, as has been held in a catena of decisions, that the land use cannot be changed, except in accordance with law. Assuming that the same could indeed be done, it would amount to land use pertaining to a Zonal Development Plan and not lay-out plan and the same could only be done after following the procedure prescribed in Section 11A of the Delhi Development Act, 1957. The illegal action of the respondents has led to the deforestation of the controlled and preserved zone of Delhi University.

18. Learned Senior Counsel submitted that if the proposed construction of a multistoried group housing society is allowed, it would lead to infringement of privacy of Meghadoot Girls' Hostel and Miranda House Girls' Hostel which are located mere 250 meters from the proposed site of construction. The proposed structure sought to be constructed right at the entrance of the University, which would impede the access of thousands of students, teachers and employees who would use that road and only choke the entrance of the University.

19. On the other hand, Mr. Tarun Johri, learned counsel for respondent No.10 submitted that the Metro project was sanctioned with a provision of generating revenue partly through property

development. In the present case, DMRC had constructed Vishwavidyalaya Metro Station, where 2 Hectares of land remained surplus and was used for development in order to generate revenue. Accordingly, the respondent No.10 applied to DDA for change of land use from 'Public and Semi Public' to 'Residential', which was approved by the Ministry of Urban Development as per its notification no. 1383 (E) dated 23.09.2005. The auction of the land in favour of the Respondent No.12 was done only after receipt of letters dated 29.03.2007 & 14.09.2007 issued by the DDA, wherein it was specifically informed that the FAR for the Plot in question would be as per the norms of the MPD -2021 for Group Housing and FAR of 200 would be permissible. Accordingly, the auction of the plot confirming FAR 200 and 33% Grounds Coverage in favour of Respondent No. 12 was completely bonafide.

20. Mr. Johri further submitted that the Ministry of Urban Development in its letter dated 30.03.2009 once again confirmed that the property development by Metro projects is in line with the global examples as Metros are highly capital intensive projects and the only way they can remain financially healthy, without government subsidies, is to increase the non-operational revenues i.e. revenues from advertisements, retailing, real estate at metro stations and parking lots revenue to the extent of 40%-50% of the total revenues as in the case of Hongkong Metro. It was further envisaged in condition No. (v) that, 'Property development on acquired land shall also be considered

as part of the 'Project'.

21. Learned counsel further submitted that the aforesaid Ministry vide its Notification dated 18.04.2011 had amended Clause 3.3.1.1 (vii) of the MPD 2021, wherein the words, 'Property Development by DMRC' was deleted. Thus, the restriction on enhancement of FAR for property development by DMRC as provided under the MPD-2021 stood modified to the effect that the FAR for projects of property development by the DMRC can be enhanced in accordance with the provisions of the MPD-2021. Moreover, in the Minutes of Meeting dated 21.05.2011, in respect of the Plot in question, DDA allowed the development control norms as available to any Group Housing Society under MPD -2021, including 200 FAR without restriction of height. Thus, this was done only after the amendment of the MPD -2021, when the restriction on enhancement of FAR as given in MPD-2021 was already deleted through amendment dated 18.04.2011. The said Minutes of Meeting was duly accepted by this Court in its order dated 18.05.2011 passed in WP(C) 3135/2010. Therefore, the permission given by the DDA in the minutes of meeting dated 21.05.2011 was completely in line with the amended provisions of the MPD-2021 and the same cannot be faulted within the eyes of law.

22. Learned counsel further submitted that the approval by the competent authority of the DDA with FAR 200 and ground coverage as 33% as applicable norms for residential development (Group

Housing) is not the first such plot of land acquired for the construction and development of the Metro Projects in the National Capital Territory of Delhi. The respondent No.10 has also leased out (5) five parcels of land for residential development and all such five Projects have been approved by the competent authority with FAR-200 and ground coverage as 33% as applicable vide applicable norms for residential development (Group Housing). The details of the land is given herein below:-

Sl. no.	Location	Plot	Ground	FAR
1.	Kyber Pass	68158.4 sqm	33.30	200
2.	Rithala	12026 sqm	33.30	200
3.	Subash Nagar	6445 sqm	33.30	200
4.	Dwarka Mod	21955 sqm	33.30	200
5.	Vishva Vidhyala	20000	33.30	200

23. Mr. Sandeep Sethi, Senior Advocate appearing on behalf of respondent No.12, has supported the submissions made by respondent No.10 and submitted that the President of India has provided a mandate to DMRC to undertake value capture through property development by selling surplus land on completion of a metro station project so as to raise additional resources for its highly intensive capital requirements as well as sustainable operations. Accordingly, DMRC desired to sell a part of 3.05 Hectare land at Vishwavidyalaya Metro Station, as it became surplus, to generate resources. Earlier under Phase-I, the

Vishwavidyalaya Metro Station used to be terminal station. In 2006, when Phase-II was envisioned, the aforesaid Metro Station was no longer the terminal station and the line from Central Secretariat to Vishwavidyalaya was extended to Jahangirpuri, resultantly, the requirement for parking space was reduced, and consequently there was a surplus land available with the DMRC. Accordingly, DMRC invited bids for residential development on 2.0 Hectare plot representing that the norms of Residential Plot-Group Housing as per MPD 2021 are to be followed which permit 200 FAR with 33% ground coverage. Accordingly, public auction was conducted on 28.07.2008, after intimating the MCD by DMRC vide letter dated 14.07.2008 of its intention of developing 2.0 Hectare of plot with 200 FAR so that development of this plot on the basis of the agreed compromise do not face any difficulty. Accordingly, respondent No.12 participated and turned out to be the highest bidder at Rs.218.20 crores. Consequently, respondent No.10, DMRC issued Letter of Acceptance dated 13.08.2008. Thereafter, DMRC and respondent No.12 executed Lease Agreement dated 15.12.2008, consequently vacant physical possession was handed over to respondent No.12 on 23.01.2009 and DMRC executed Lease Deed of 2.0 Hectare plot in favour of respondent No.12, registered in the office of Sub Registrar 1, Delhi on 19.02.2013.

24. Mr. Sethi further submitted that respondent No.12 submitted a lay out plan to MCD on 30 March 2009 on the basis of norms applicable to Residential Plot-Group Housing. In response thereto,

MCD vide letter dated 8.06.2009 sought clarification from DDA whether the 2.0 Hectare plot leased by DMRC to respondent No.12 can be considered as a separate entity for the purpose of approval of Group Housing with 200 FAR. On 25.06. 2009, DMRC informed DDA that they have entered into Lease Agreement with respondent No.12 on 15.12.2008 for Residential Plot-Group Housing development on 2.0 Hectare and requested DDA to confirm 200 FAR to MCD. However, DDA in complete u-turn and in contravention to MPD-2021 norms, replied to MCD vide letter dated 19.08.2009 that Development Control Norms shall be as per Notification dated 20.01.2005, prescribing Development Control Norms for Metro Stations viz 25% ground coverage and 100 FAR with no height restrictions. Further, DDA in a complete volte face and in derogation purported to withdraw its earlier decision. The said action of DDA was on the erroneous and illegal plea that Notification dated 20.01.2005 will prevail as it was notified much before the Notification dated 23.09.2005 for change of land use of 3.05 Hectare. MCD issued letter dated 22.09.2009 informing DMRC and respondent No.12 about DDA's decision dated 19.08.2009. Thereafter, DMRC and respondent No.12 made various representations to DDA. The matter was considered in DDA's meeting held on 17.02.2010 in which the following decision was taken:-

> *"4. The Lt Governor also constituted a Committee under the Chairmanship of Engineer Member, DDA with Chief Town Planner, MCD and ChiefEngineer, DMRC as members to survey the entire area and examine the implications on the*

> *proposed high-rise buildings on the privacy and integrity of the Delhi University environment. He directed that the Committed should give its report within a week."*

25. Accordingly, a joint inspection of the site was conducted by the committee members on 19.02.2010 whereby observed and concluded that the proposed high rise property development on 2.0 Hectare plot will not affect the privacy of the girls' hostel nearby, will not add to any parking problem and will also not affect the serenity / tranquillity of University area. Moreover, Shri Sreedharan, Managing Director of DMRC submitted a Joint Inspection Report of the Committee to Lt. Governor vide letter dated 10.03.2010 and informed that the apprehensions raised were incorrect. In addition, a legal opinion was sought by DMRC from Justice R.C. Lahoti, Ex-Chief Justice of India, whereby he opined that the planned Group Housing development on 2.0 Hectare plot with 200 FAR and no height restrictions is in accordance with the provisions of MPD 2021.

26. Mr. Sethi further submitted that respondents No.10 and 12 made efforts to persuade DDA to correct its action and restore Group Housing norms with 200 FAR but have failed to yield any result. Being left with no alternative, respondent No.12 filed Writ Petition No.3135/2010 impugning letter dated 19.08.2009 issued by DDA whereby stated that MPD 2001 was amended by the Government of India vide notification dated 20.01.2005 in which Metro Stations along

with property development up to a maximum area of 3 Hectare was permitted in all zones, except Recreation Use Zone and the development norms of such development was 25% ground coverage and 100 FAR, including area under Metro Station with no height restrictions subject to approval of the statutory bodies. The above stated norms were subsequently incorporated in MPD 2021. Since the Development Control Norms for Property Development at the Metro Stations was notified much before the notification of Change of Land Use of an area measuring 3.05 Hectare from 'public, semi-public' to 'residential', therefore, Development Control Norms are applicable as per Gazette Notification dated 20.01.2005.

27. Mr. Sethi further submitted that since the said decision mitigated the grievance of respondent No. 12, this Court ordered on 18.05.2011 that nothing remains to be adjudicated and with these observations, the aforesaid writ petition was disposed of.

28. Learned Senior Counsel further submitted that the petitioner has filed the present writ petition impugning DDA's decision dated 12.05.2011 resolving to allow development control norms as applicable under the clause 'Group Housing' viz 200 FAR without height restriction on 2.0 Hectare plot leased by DMRC to respondent No.12, and praying inter alia for quashing the decision taken by DDA and direct the respondents to follow 'Development Control Norms for

Metro Stations' viz 25% ground coverage and 100 FAR with no height restrictions.

29. Learned Senior Counsel further submitted that the controversy raised in the petition has already been fully adjudicated upon by the Division Bench of this Court in three Writ Petitions, viz., WP(C) No.3135/ 2010, WP(C) No.8675/2011 and WP(C) No.6624/2012 pertaining to the plot in question. Vide order dated 10.05.2010, passed in WP(C) No.3135/2010, the Division Bench of this Court observed that the pendency of this matter will not come in the way of the respondents making an endeavour to resolve the controversy which has been created i*nter se* the respondents. Moreover, on 18.08.2010 counsel for the DDA submitted that the *lis* raised in the aforesaid petition being discussed at the highest level of the DDA and there is a possibility that the controversy may be put to rest. Accordingly, on 07.03.2011 DDA filed an affidavit placing on record a resolution dated 21.01.2011, passed by DDA permitting construction of group housing but with height restriction upto 8 storeys. Accordingly, this Court directed the DDA to invite the highest officer of the DMRC and consider the height restriction with liberty to respondent No.12 to submit representation in this regard. Accordingly, DDA in its meeting dated 12.05.2011 considered the height issue and resolved that 2.0 Hectare plot leased out to respondent No.12 shall be considered as a separate entity and the Development Controls as applicable under the clause 'Group Housing' with no height restriction shall apply. On

18.05.2011 DDA's counsel placed on record the Authority's decision to allow 200 FAR with "no height restriction". Since the said decision mitigated the grievance of the respondent No.12, this Court observed that nothing remains to be adjudicated and with these observations the writ petition was disposed of.

30. Mr. Sethi further submitted that it is pertinent to mention here that a separate Writ Petition (C) No.8675 of 2011 was filed by one "Association of Metro Commuters" inter alia challenging the allocation of the said land for residential development, which came to be dismissed by the Division Bench of this Court vide order dated 14.12. 2011 wherein the Court after detailed perusal of the records held that there is no illegality in the actions of DMRC / DDA and dismissed the petition.

31. Moreover, vide W.P. (C) 6624-6625/2012 titled as ***Sanjay Khanna (HUF) v. UOI and Ors***., the acquisition was challenged by the erstwhile lessees of the plot in question. The Petitions were dismissed by this Court stating that there is no question of colourable exercise of power and the plot used by DMRC for commercial purpose is being done as per the settled principles of law. The said order was challenged by SLP which was also dismissed.

32. Mr. Sethi submitted that despite the fact that the said issue has been adjudicated upon thrice by this Court, the present Writ Petition again without any *locus* and proper authority raises the same issues in

the present petition again by suppressing the adjudication of the said issues in the aforementioned three Writ Petitions. The present Writ Petition has been filed with oblique motives and with malafide intentions for causing losses to the respondents No.10 & 12.

33. Mr. Sethi, learned Senior Counsel further submitted that land use of the 3.05 Hectare land was changed to 'Residential' vide Notification dated 23.09.2005, Development Control Norms for Residential Plot-Group Housing only will apply and no other norms are applicable to this plot. This controversy whether the 'Development Control Norms for Residential Plot-Group Housing' or the 'Development Control Norms For Metro Stations' apply to the said plot in question, was the subject matter before this Court in WP(C) 3135/2010. The issue was finally set to rest after DDA in a meeting held under the directions of this Court and chaired by Lt. Governor decided on 21.01.2011 and 12.05.2011, that Group Housing Norms with no height restriction will apply in respect of subject 2.0 Hectare plot. Therefore, petitioner cannot be allowed to re-open and re-agitate an issue already adjudicated / settled by a Division Bench of this Court.

34. Moreover, DDA / MCD have allowed Group Housing norms, viz., 200 FAR, 33.3% Ground Coverage and no height restriction in respect of 5 properties including the plot in question auctioned by DMRC for property development as Group Housing. The aforesaid 5

properties have been mentioned in the submission of the DMRC by the counsel for the respondent No.10 which is reproduced as under:-

> "The relevant Development Control norms in MPD 2021 are as follows:
>
> (Pg25) Ch-4 Shelter

Table 4.3: Uses / Use Activities Permitted in Use Premises

Use	Definition	Use/Use Activities Permitted
Residential Plot – Group Housing	A premise of size not less than 3000 sqm (2000 sqm. For Slum/JJ rehabilitation) comprising of residential flats with basic amenities like parking, park, convenience shops, public utility etc.	Residential flat, mixed use Plot activity as per the Master Group Plan provisions, retail shops of confectionery, grocery & general merchandise, books and stationery. Chemist, Barber, Laundry, Tailor, Vegetable Shop (On ground floor with an area up to 20 sqm. each). Community Room, Society Office, Creche / Day Care Centre, Religious, Senior Citizen recreation room. Swimming Pool.

Pg 28 -4.4.3 Control for Building/Buildings within Residential premises

B. Residential Plot -Group Housing

Minimum size of plot: 3000 sq. m.
Maximum Ground coverage: 33.3%
Maximum FAR: 200
Height NR (Subject to clearance from AAI / Fire Department and other
statutory bodies.
Parking: 2.0 ECS/100 sqm built up area"

Ch-12 Transportation

Pg 82 -Development Controls for Metro Stations

1. Metro Stations along with property development (composite Development) up to a maximum area of 3.0 ha shall be permitted in all Use Zones, except in Recreational and Regional Park / Ridge Use Zone, Lutyens' Bungalow Zone and Heritage Zones, subject to approval of Technical Committee of DDA.

2. This enabling provisions of property development would have the following broad development controls:

(i) 25% ground coverage and 100 FAR, including area under Metro Station with no height restrictions (emphasis supplied) and subject to approval of the statutory bodies such as ASI, Airport Authority, and DUAC etc.
(ii) In addition to the requirement of parking for Metro Stations, parking for the commercial component will be @ 2 ECS per 100 sq. m.

(iii) The development shall be undertaken in a composite manner and DMRC shall obtain approval of all the concerned local bodies / agencies."

Chapter 17 Development Code

"Pg 123 -Clause 2.0 Definitions

In this code unless the context otherwise require:

2(7) Use Premises means one of the many sub divisions of a Use Zone, designated in an approved layout plan, for a specific Use. Land use of a premise has to be determined on the basis of an approved layout plan.

3(3) *Each use premises shall be permitted to have specific uses/use activities out of the prescribed uses/use activities with or without conditions.*

5.0 The use premises and use/use activities with similar nomenclature are given with the controls of specific premises in the respective chapters."

35. Moreover, DDA had examined the applicable Development Control Norms for this plot as a Residential Plot-Group Housing vis-a-vis the Development Control norms for Metro stations notified on 20.01.2005. After detailed examination, DDA came to a conclusion that since the land use has been notified as residential on 23.09.2005, Residential Plot-Group Housing norms (200 FAR, 33.3% Ground Coverage and no height restriction) are applicable to 3.05 Hectare Land.

36. Mr. Sethi further submitted that two independent committees have submitted the report that the development is within the control

norms applicable to this area and that it will not affect the aesthetic beauty of the North Campus of Delhi University. He further submitted that as contended by the petitioner, the Group Housing Norms were made applicable without amending MPD 2021. Learned counsel further submitted that in the present case the relevant amendment in the Master Plan was required to be made in respect of change of land use from PSP to residential. This was done by DDA following due process of law as contemplated in Section 11-A of Delhi Development Act, 1957. Accordingly, the DDA had issued a Public Notice dated 19.12.2004 inviting objections before changing the land use of the plot from PSP to residential. No objections were received and a Notification dated 23.09.2005 was issued changing the land use of the plot. There was, thus, complete compliance of the requirements of Section 11A of the Delhi Development Act.

37. Mr. Sethi submitted that DDA is the sole decision maker in respect of provisions of Master Plan and has full powers to grant site specific approvals. To strengthen his arguments, learned Counsel relied upon the judgment of this Court in the case of ***Kenneth Builders and Developer Ltd. v. Union of India and Ors., W.P.(C) No. 10647 of 2010*** in which the Court observed as under:-

> *"28: In deciding this writ petition, an important question which arises for consideration is -who decides the land use of a particular piece of land in Delhi? If the land use is to be determined by the DDA through the publication of the Master Plan, then the question arises as to whether the DPCC or the*

> *Department of Forest can object to a particular land use?*
>
> .....
>
> *30. From these provisions, it is clear that the making of the master plan and the zonal plans goes through an elaborate procedure. Even the modification carried out to any of these plans has to go through a series of steps which include the inviting of objections and the consideration thereof. From these provisions it is clear that the stand taken by the DDA that once the master plan shows the land in question as earmarked for a particular use then no other authority can challenge the same. The master plan and the zonal plans are prepared by the DDA and they have a statutory flavour. Once the DDA has gone through the formalities required under law in preparing the master plan and/or the zonal plans and/or in carrying out any modifications therein, the land use of a particular area would stand determined as per the said plans.*
> *31. When the land owning agency as also the authority which prepares he Master Plan clearly and categorically states that the land in question does not fall within the ridge area and the land uses is residential, we fail to see as to how the DPCC or the Department of Forests, NCT of Delhi can raise any objection on this account"*
> *32. Therefore, we are of the view that the stand taken by the DBA that the land use of the project site is residential stands established...."*

38. Moreover, the stand of DDA in the present case is that the land use of the plot in question was changed from PSP to Residential and,

therefore, Development Control Norms for Residential Plot-Group Housing apply to this plot. Further, MCD's Standing Committee has approved the layout plan for development of Group Housing on 2.0 Hectare plot as a separate entity u/s 313 of the DMC Act in its meeting held on 22.03.2013 vide resolution No. 315. Regarding petitioner's contention that the land acquired for MRTS Project was acquired after converting the land use from 'Residential' to 'Public and semi public' and now DDA cannot re-convert it to 'Residential' defeating the purpose of acquisition. Whereas the land use of 3.05 Hectare land has been changed only once from PSP to 'Residential' vide Notification dated 23.09.2005. The same is evident from the information obtained by respondent No.12 under RTI. Once the land is acquired in a lawful manner and is vested in the acquiring authority, and if a portion of the acquired land is left unused after achieving the public purpose, the unused portion can be used for a purpose other than it was acquired for. To strengthen his arguments, learned Senior Counsel for the respondent No.12 relied on the judgment of this Court in the case of ***Adil Singh v. UOI and Ors, W.P. (C) No. 2948 of 2007*** in which the Court observed as under:-

> *"45. From all these decision, a clear line of thought is discernible, and that is, that where land is acquired for one public purpose and part of it is left unused, the same can be used for another pubic purpose. In case this is done, merely because the unused land is used for another public purpose would not be a ground for challenging the original acquisition itself. It is further*

> *clear that once the land has vested in the State either by virtue of section16 of the said Actor by virtue of Section 17(1), in urgent cases, there is no question of the land being re-vested in the erstwhile owners. The Government can withdraw from the acquisition only up to the point it does not take possession of the land sought to be acquired. Once possession has been taken, the acquisition cannot be given up. It is also clear that trough part of the land acquired for one public purpose could not be used for another public purpose, without invalidating the acquisition itself, land acquired for a public purpose cannot be used for a private objective. But, even if part of the land is sought to be used for a commercial purpose, the same would not revert to the original owner though the appropriate Government would be subject to an action in case the allotment for commercial use is arbitrary or unreasonable. Where a portion of the land acquired for a public purpose is left unused, it would be open to the state government to utilize the same for a commercial purpose provided it is done in a transparent manner either through an open tender or through an auction.*"

39. Mr. Sethi further submitted that the auction has been conducted by DMRC in a transparent manner, i.e., through a public auction and there is no allegation that the auction was not done in accordance with law. Moreover, there was no *malafide* on part of DDA. Thus it is clear that DDA took a conscious decision in its meeting dated 21.01.2011 with respect to the applicability of FAR for Group Housing and further again took an informed decision at the highest level vide its resolution dated 12.05.2011 that no height restrictions can be imposed on the

proposed project under the provisions of MPD 2021.

40. It is further submitted that as per the settled law the Court would not interfere in a policy decision taken by a Government body unless some illegality, impropriety, *malafide* or unreasonableness can be proved on part of such decision making body as held in the cases of ***Sethi Auto Service Station and Anr. Vs. Delhi Development Authority and Ors. (2009) 1 SCC 180; and Residents Welfare and Recreation Association (Regd.) & Ors. Vs. DDA & Ors. W.P. (C) 1815/2009.***

41. Mr. Sethi further submitted that the principle of *res judicata* bars re-opening of the decision of this Court in WP(C) 3135/2010. DDA has the final authority to rule on questions of land use/norms as held in the case of ***Kenneth Builders*** *(Supra)*. The fact that DDA has to decide all issues pertaining to MPD2021 has been provided within the powers of DDA as per clause 17 of the Introduction of the MPD 2021.

42. Mr. Sethi further submitted that the present petition has been filed by Mrs. Alka Sharma in her capacity as the Officiating Registrar of Delhi University. There is no authority given by the Executive Council of Delhi University authorizing her to file the present petition. In fact, there cannot be any such authority as Executive Council of Delhi University never passed a resolution to file the present writ petition.

43. However, vide Order dated 10.09.2013 this Court directed the petitioner to file an affidavit disclosing as to how the decision to file the present writ petition was taken. Accordingly, the petitioner has filed an affidavit referring to Resolution No. 56 passed by The Academic Council on 20.03.2012 and Resolution No. 173 passed by the Executive Council on 21.03.2012 and stated that pursuant to above resolutions, the present writ petition was filed. Thus, the Registrar has filed the present petition.

44. While concluding his arguments, Mr. Sethi submitted that respondent No.12 received all approvals from all statutory bodies, viz., AAI, AST, Fire (CFO), DDA, DUAC, Forest, MCD, NMA, SEAC, etc.. Therefore, all approvals have been obtained but construction has not yet started. Six years have been spent on same issues causing huge loss to respondents No.10 & 12 both in money and reputation.

45. Mr. Arun Birbal, Ld. Counsel appearing on behalf of DDA has fully supported the case of respondent No.10 and 12. Further added that for determining the land use, DDA is the proper and final authority. Vide decision dated 12.05.2011, DDA has resolved and allowed development control norms as applicable under the clause 'Group Housing' viz., 200 FAR with 33% ground coverage without height restriction on the plot in question. The said plot is not part of North Campus of Delhi University, therefore, the petitioner has no

locus to file the present petition. Moreover, land use has been changed by due process of law.

46. I have heard learned counsels for the parties.

47. Respondent No.10 DMRC had constructed Vishwavidyalaya Metro Station, where 2 Hectares of land remained surplus and was to be used for development in order to generate revenue. Accordingly, the respondent No.10 applied to DDA for change of land use from 'Public and Semi Public' to 'Residential', which was approved by the Ministry of Urban Development as per its notification no. 1383 (E) dated 23.09.2005. The auction of the land in favour of the Respondent No.12 was granted only after receipt of letters dated 29.03.2007 & 14.09.2007 issued by the DDA, wherein it was specifically informed that the FAR for the Plot in question would be as per the norms of the MPD -2021 for Group Housing and FAR of 200 with 33% ground coverage would be permissible. Moreover, the Ministry of Urban Development vide its Notification dated 18.04.2011 had amended Clause 3.3.1.1 (vii) of the MPD 2021, wherein the words, 'Property Development by DMRC' was deleted. Thus, the restriction on enhancement of FAR for property development by DMRC as provided under the MPD-2021 stood modified to the effect that the FAR for projects of property development by the DMRC can be enhanced in accordance with the provisions of the MPD-2021. Moreover, in the Minutes of Meeting dated 21.05.2011, in respect of the Plot in question, DDA allowed the development control norms as available to

any Group Housing Society under MPD -2021, including 200 FAR without restriction of height, on the residential plot leased out to respondent no. 12 by DMRC near Vishwavidyalaya Metro Station. Therefore, the permission given by the DDA in the minutes of meeting dated 21.05.2011 was completely in line with the amended provisions of the MPD-2021.

48. It is pertinent to mention here that the respondent No.10 has also leased out (5) five parcels of land for residential development and all such five Projects have been approved by the competent authority with FAR-200 and ground coverage as 33%. In addition to the land in question, the other 4 (four) parcels of land are Kyber Pass, Rithala, Subash Nagar and Dwarka Mod.

49. It is also pertinent to mention here that the situation in question arose for the reason that earlier under Phase-I, the Vishwavidyalaya Metro Station used to be a terminal station. In 2006, when Phase-II was envisioned, the aforesaid Metro Station remained no longer a terminal station and the line from Central Secretariat to Vishwavidyalaya was extended to Jahangirpuri, resultantly, the requirement for parking space was reduced, and consequently there was a surplus land available with the DMRC. Accordingly, DMRC invited bids for residential development on 2.0 Hectare plot representing that the norms of Residential Plot-Group Housing as per MPD 2021 would be applicable which permit 200 FAR with 33% ground coverage. Accordingly, respondent No.12 participated and

turned out to be the highest bidder at Rs.218.20 crores.

50. Thereafter, respondent No.12 submitted a lay out plan to MCD on 30.03.2009 on the basis of norms applicable to Residential Plot-Group Housing. In response thereto, MCD vide letter dated 8.06.2009 sought clarification from DDA whether the 2.0 Hectare plot leased by DMRC to respondent No.12 can be considered as a separate entity for the purpose of approval of Group Housing with 200 FAR. On 25.06. 2009, DMRC informed DDA that they have entered into Lease Agreement with respondent No.12 on 15.12.2008 for Residential Plot-Group Housing development on 2.0 Hectare and requested DDA to confirm 200 FAR to MCD. However, DDA replied to MCD vide letter dated 19.08.2009 that Development Control Norms shall be as per Notification dated 20.01.2005 prescribing Development Control Norms for Metro Stations viz 25% ground coverage and 100 FAR with no height restrictions.

51. Thereafter, the matter was considered in DDA's meeting held on 17.02.2010, whereby the Lt. Governor constituted a Committee under the Chairmanship of Engineer Member, DDA with Chief Town Planner, MCD and Chief Engineer, DMRC as members to survey the entire area and examine the implications on the proposed high-rise buildings on the privacy and integrity of the Delhi University environment. Accordingly, the Lt. Governor directed that the Committed would give its report within a week. Pursuant to the said

direction, a joint inspection of the site was conducted by the committee members on 19.02.2010 whereby observed and concluded that the proposed high rise property development on 2.0 Hectare plot will not affect the privacy of the girls' hostel nearby, will not add to any parking problem and will also not affect the serenity / tranquillity of University area.

52. Thereafter, respondents No.10 and 12 made efforts to persuade DDA to correct its action and restore Group Housing norms with 200 FAR but failed to yield any result. Being aggrieved, respondent No.12 filed Writ Petition No.3135/2010 impugning the letter dated 19.08.2009 issued by DDA. During the pendency of the afore-mentioned writ petition, DDA informed the Court that the impugned decision was being reconsidered at the highest level in DDA. Accordingly, DDA reconsidered the issue and resolved that 2.0 Hectare plot leased out to respondent No.12 shall be considered as a 'separate entity' and the Development Control Norms for Group Housing with no height restriction shall apply. Moreover, DDA's counsel placed on record the Authority’s decision applicable on Group Housing Norms with 200 FAR and 'No height restriction'.

53. It is pertinent to mention here that a separate Writ Petition (C) No.8675 of 2011 was filed by one "Association of Metro Commuters" inter alia challenging the allocation of the said land for residential

development, which was dismissed by the Division Bench of this Court vide order dated 14.12.2011 and held as under:

> *"6. We are unable to agree. A person, who brings a Us before the Court, even in public interest, is required to, unless the facts speak for themselves, satisfy the Court as to the illegality in the actions of the State /public body affecting the public interest. A petitioner, even in a Public Interest Litigation cannot seek commencement of a roving and fishing inquiry. It was so held in Narmada Bachao Andolan Vs. State of Madhya Pradesh 2011 (5) SCALE 624. A litigant who is unwilling to collect / gather facts, which in today's transparent regime are available on the asking, cannot be allowed to waste the time of the Court*
>
> *7. Even otherwise, we find that the said residential development to which objection is taken, having commenced at least in the year 2007 if not earlier i..e four years prior hereto and the agreement of the respondent No. 1 DMRC with the respondent No. 4 Young Builders Pvt. Ltd. is also of 15.12.2008. From the documents filed by the petitioner itself we also find the Government of India to have accorded permission to the respondent No. 1 DMRC to generate resources through development on the land transferred to it by the Government and sanction having been accorded as far back as in 2007 by DDA for the said residential development at Vishwa Vidyalaya MRTS metro station. There is thus nothing before us as to show that there is any irregularity in the actions with respect whereto the petition is filed."*

54. Moreover, vide W.P. (C) 6624-6625/2012 titled as ***Sanjay Khanna (supra)***, the acquisition was challenged by the erstwhile lessees of the plot in question. The Petitions were also dismissed. The order passed in aforementioned petition was challenged by filing SLP which was also dismissed. Thus, the issue was finally set to rest, after DDA in a meeting held under the directions of this Court and chaired by Lt. Governor decided on 21.01.2011 and 12.05.2011, that Group Housing Norms with no height restriction will apply in respect of subject 2.0 Hectare plot. Moreover, clause-B of 4.4.3 of MPD 2021 provides that on the minimum size of 3000 sq.m. plot, maximum ground coverage applicable would be 33.3% with maximum FAR of 200. In addition, as per Chapter-12 titled Transportation of MPD 2021, Metro Stations along with property development (composite Development) up to a maximum area of 3.0 ha shall be permitted in all Use Zones, except in Recreational and Regional Park / Ridge Use Zone, Lutyens' Bungalow Zone and Heritage Zones, subject to approval of Technical Committee of DDA.

55. It is worth noting that the process of change of land use for 3.05 Hectare plot had been initiated since 19.12.2004, which preceded Notification dated 20.01.2005. In any case, Notification dated 20.01.2005 apply only in cases where DMRC desires property development without change of land use and that too on plots upto 3.0 Hectare. Thus, Notification dated 20.01.2005 makes it clear that it (Incorporated in MPD-2021, Chapter-12 as 'Development Control

Norms for Metro Station') will not apply in the present case as the size of the plot in question is more than 3.0 Hectare.

56. Respondent No.10, DMRC was desirous of using its properties for commercial/residential development to generate resources which was proving to be extremely time consuming exercise because of the cumbersome procedures involved in change of land use. Accordingly, DMRC requested DDA to dispense with the change of land use and allow property development under automatic use. The request of DMRC was deliberated and considered by DDA whereby it was decided that blanket permission cannot be given and property development by DMRC without change of land use will be restricted on plots up to a maximum area of 3 Hectare and will have maximum 100 FAR, 25% Ground Coverage with no height restriction. Accordingly, Notification dated 20.01.2005 was issued which starts with "Notwithstanding the land use provisions of Master Plan property development shall be permitted..... " Thus, this Notification was an 'enabling' provision to facilitate DMRC to take up property development and generate resources in an expeditious manner without undergoing the cumbersome procedure of change of land use on plots upto 3.0 Hectare. No doubt, while developing property on land above 3.0 Hectare, DMRC has to necessarily follow the procedure of change of land use which would then be subject to norms applicable under respective chapters in MPD 2021.

57. In the present case, Notification dated 20.01.2005 could not have applied because the size of the plot in question is 3.05 Hectare which is more than the prescribed limit of 3.0 Hectare. Therefore, Respondent no.10 DMRC, had no choice but to necessarily follow the process of change of land use. The same was done by following due process of law and land use was changed from PSP to Residential vide Notification dated 23.09.2005, after which Development Control Norms of Residential Plot -Group Housing only can apply.

58. The claim of the petitioner is that the 3.05 Hectare land falls in the 'controlled zone' of Delhi University and that a height restriction ought to have been imposed on the Project otherwise it will be in direct conflict with MPD 2021. However, as submitted by ld. Counsel for respondents that there is nothing called "controlled zone" of Delhi University under MPD 2021 or Zonal Development Plan for Zone-"C". However, MPD 2021, Chapter 11-Urban Design, Para 11.3 provides that restriction on tall buildings would be necessary in important areas like Lutyen's Bungalow Zone, Civil Lines Bungalow Zone and North Delhi Campus. The plot in question does not fall within any of these restricted areas. In any case, the same was also established by respondent No.12 during arguments by showing the Zonal Development Plan for Zone-'C (Civil Lines Zone) that the land in question does not fall within any restricted area in Zone-"C" i.e. the Civil Lines Bungalow Zone or the North Delhi Campus. In fact that land does not fall within Delhi University North Campus which is

established from the information obtained by respondent No.12 under RTI wherein it is stated that the 3.05 Hectare plot is not a part of Delhi University.

59. It is pertinent to mention here that two independent committees have submitted the report that the development is within the control norms applicable to this area and that it will not affect the aesthetic beauty of the North Campus of Delhi University. In the present case the relevant amendment in the Master Plan was required to be made in respect of change of land use from PSP to residential. This was done by DDA following due process of law as contemplated in Section 11-A of DD Act,1957. Accordingly, the DDA had issued a Public Notice dated 19.12.2004 inviting objections before changing the land use of the plot from PSP to residential. The respondents did not receive any objection from any corner, thereafter, issued Notification dated 23.09.2005 changing the land use of the plot.

60. The contention made by the petitioner that the present plot cannot be treated as a separate entity, the DDA in its meetings held on 21.01.2011 and 12.05.2011 deliberated the said issue in detail and only thereafter decided to treat 2.0 Hectare plot as a separate entity and allowed Group Housing norms without height restriction in view of the fact that the said site had already been notified as residential. The said meeting was held under the directions of this Court as issued in WP (C) No. 3135/2010. The meeting was chaired by Lt. Governor of Delhi

and attended, amongst others, by Vice Chairaian of DDA, Members of Authority and special invitees such as Chief Secretary, Principal Secretary and Secretary to Govt. of NCT of Delhi, Principal Secretary to LG and Managing Director, DMRC.

61. The land in issue does not come under a development area as defined under Section 12 of the DD Act, 1957. The 'Authority' of DDA is constituted under Section 3 of the DD Act, 1957. By virtue of Section 6 of DD Act, the executive power of DDA vests in this Authority. Once the DDA and its Authority have gone through the formalities required under law in preparing the master plan and/or the zonal plans and/or in carrying out any modifications therein, the land use of a particular area would stand determined as per the said plans. Moreover, FAR of 200 with no height restriction for residential complexes has been specifically made available to the University also under MPD-2021. This would enable the University to provide shelter to its employees and teachers.

62. The stand of DDA in the present case is that the land use of the plot in question was changed from PSP to Residential and, therefore, Development Control Norms for Residential Plot -Group Housing apply to this plot. Further, MCD's Standing Committee has approved the layout plan for development of Group Housing on 2.0 Hectare plot as a separate entity u/s 313 of the DMC Act in its meeting held on 22.03.2013 vide resolution No. 315.

63. Regarding petitioner's contention that the land acquired for MRTS Project was acquired after converting the land use from Residential to Public and semi public, and now DDA cannot re-convert it to Residential defeating the purpose of acquisition. Whereas, the land use of 3.05 Hectare land has been changed only once from PSP to Residential vide Notification dated 23.09.2005 as is evident from the information obtained by respondent No.12 under RTI. Once the land is acquired in a lawful manner and is vested in the acquiring authority, and if a portion of the acquired land is left unused after achieving the public purpose, the unused portion can be used for a purpose other than it was acquired for as held in the case of ***Adil Singh (supra).***

64. As per the settled law, the Court should not interfere with any policy decision taken by a Government body unless there appears to be some illegality, impropriety, *malafide* or unreasonableness on part of such decision making body. However, the petitioner has failed to establish the same.

65. Moreover, the petition suffers from latches, which has been filed almost with delay of 7-8 years. The existence of the factum of land in question has been within petitioner's knowledge since beginning. In view of such delay on part of the petitioner to challenge the project, the present writ petition deserves to be dismissed on ground of delay and latches, as held in the case of ***State of M.P. and Ors. vs. Nandlal Jaiswal and Ors. (1986) 4 SCC 566*** in which the Apex Court observed

that the delay of only 10 months in challenging the policy also cannot be condoned.

66. The respondent No.12 has received all approvals from all statutory bodies, viz., AAI, AST, Fire (CFO), DDA, DUAC, Forest, MCD, NMA, SEAC etc., but construction has not yet started.

67. In view of the above discussion, I find no merit in the instant petition and the same is also hit by delay and latches.

68. Accordingly, instant petition is dismissed with no order as to costs.

CM Nos. 5899/2012, 7676/2012, 11637/2012, 1045/2013 and 6676/2014

The instant applications are dismissed as infructuous.

SURESH KAIT, J

APRIL 27, 2015
RS

IN THE HIGH COURT OF DELHI AT NEW DELHI

Judgment reserved on: October 04, 2018
Judgment delivered on: October 29, 2018

+ LPA 89/2018, CM Nos. 8651/2018, 8654/2018, 8655/2018, 26300/2018 & 41259/2018
UNIVERSITY OF DELHI

..... Appellant

Through: Mr. Ramji Srinivasan, Sr. Adv. and Mr. Dayan Krishnan, Sr. Adv. with Mr. Mohinder J.S. Rupal, Mr. Anurag Ojha, Mr. Prasanna S.,Mr.Prang Newmai, Ms. Slomita Rai and Mr.Bunmeet Singh Grover, Advs.

versus

UNION OF INDIA & ORS

..... Respondents

Through: Mr. P.S. Narsimha, ASG with Mr. Tarun Johri, Mr. Ankur Gupta and Mr. Ankit Saini, Advs. for DMRC
Mr. Anil Dabas, Adv. for R-1 & R-1A
Ms. Mini Pushkarna, SC with Ms.Swagata Bhuyan, Ms. Shiva Pandey & Ms. Neha Goel, Advs. for NDMC/R-7
Mr. Arvind Nigam, Sr. Adv. with Mr. Manish Srivastava, Mr. Mikhil Sharda & Mr. Mehtaab Singh Sandhu, Advs. for R-12
Mr. Prashant Singh, Adv. for Intervenor

Mr. Rajiv Bansal, Sr. Adv. with
Mr.Namit Suri, Ms. Fiza Saluja,
Ms.Aprajita Gupta, Mr. Saaket
Jain, Mr.Kunal Kumar &
Mr. Dipender Chauhan, Advs.
for DDA
Mr. Febin Mathew with
Mr. Dhiraj Philip, Advs. for
R-11/DUAC

CORAM:
HON'BLE THE CHIEF JUSTICE
HON'BLE MR. JUSTICE V. KAMESWAR RAO

J U D G M E N T

V. KAMESWAR RAO, J

CM No. 8654/2018 u/S 151 CPC (condonation of delay)

1. This is an application filed by the appellant seeking condonation of 916 days delay in filing the appeal. Replies to the application have been filed by the respondent No.3 / DDA, respondent No.10 / DMRC, respondent No.12 / Young Builders Pvt. Limited. Rejoinders to the replies filed by the aforesaid respondents have also been filed by the appellant University.

2. Mr. Ramji Srinivasan, learned Senior Counsel appearing for the appellant University submitted that the present appeal has been filed on March 01, 2018 to assail the judgment dated April 27, 2015 of the learned Single Judge in W.P. (C) 2743/2012 after a delay of 916 days which was principally due to the reasons as

explained in the application and the rejoinder to the reply to the application, albeit, the hour to hour-minutes to minutes cause is not pleaded but bona fide factum of situation beyond the appellant control has been delineated. According to him, the present appeal is different from other litigations preferred or contested by the appellant. It is only the case where the approval from the Executive Council of the University of Delhi was required to be taken and before such approval various deliberations preceded so as to apprise the Executive Council of the different shades of the subject matter. Being the statutory body and adherence to the just method of decision making requires consultation with effective department of the University itself and therefore, the final say in the matter rest with the Executive Council which includes the Senior most Deans, democratically elected representatives of Teachers, Chancellor's nominee, Visitor's nominee, Registrar, Treasurer, Director South Campus and Vice Chancellor. He stated that there is no negligence or deliberate inaction or red-tapism on the part of the appellant. He stated that it is a settled law qua the condonation of delay that it is not the degree of delay but the cause of delay which assumes significance. In other words, it is the sufficiency

of reason which is the bed rock for deciding the condonation. He in support of his application has narrated the following facts:

(a) The judgment of learned Single Judge dated April 27, 2015 was sent by the counsel representing the University quite late. It was then placed before the legal cell of the University for examining the matter and deciding the further course of action. After a detailed scrutiny which took time since the case filed comprising of approximately 1001 pages was required to be examined.

(b) After going through the voluminous paper book it was opined that the matter be referred to Vice Chancellor for consideration and pursuant thereto a meeting was held wherein it was decided that the matter needs to be dealt with holistically having regard to all the issues decided by the learned Single Judge.

(c) The issue could not be taken up for consideration as the post of Vice Chancellor had fallen vacant w.e.f. October 28, 2015 and the important issue could be taken up for consideration after the new Vice Chancellor had assumed office and taken stock of things.

(d) That the selection process of Vice Chancellor had taken

considerable time as there are specific procedures to be followed for the same.

(e) That on March 10, 2016 the new Vice Chancellor joined the office and in order to ensure democratic functioning of the University, it was decided by the newly appointed Vice Chancellor to constitute a Committee. The terms of reference of the five member committee was to recommend the course of action to the University in the light of the dismissal of the writ petition filed by the University.

(f) The Committee gave its report on November 11, 2016 which included the University to take appropriate legal professional opinion and guidance.

(g) That based on the report of the Committee it was decided that the subject matter be referred to the Executive Council for the final decision in the matter.

(h) The matter was placed before the Executive Council on February 28, 2017 when the subject matter was discussed. It was again discussed on March 07, 2017 where a decision was taken to prefer an appeal against the order of the learned Single Judge dated April 27, 2015. In the meanwhile, representations were received from differently abled students and Faculty in the light

of the proposed project by the private builder at the very main entrance of the University. Such representations were required to be considered and were accordingly forwarded to the Equal Opportunity cell for consideration.

(i) The said cell examined the issue in the context of the Disability Act 2016 and probable outcome which the project in contraction with the Master Plan will entail to the vulnerable section of society. The Equal Opportunity cell submitted its report on April 28, 2017. The same was placed before the Competent Authority for a decision regarding the future course of action. The report of the equal opportunity cell was considered at various levels of the University which process entailed a period of five to six months before a considered opinion could be generated by the University of Delhi. The representations and the reports could be finally considered by the University of Delhi during the end of the year 2017.

(j) In the interregnum an accident occurred at Chattra Marg which led to the preparation of a report by the office of the Proctor of the University dated February 05, 2018 wherein it was recommended that the area be declared as accident prone. A reference is made about the filing of a PIL by differently abled

persons and the order passed therein.

(k) A legal opinion was sought, draft petition was prepared which thereafter got vetted and settled by the Senior Counsel. The finalized appeal was considered at the highest level of the University for taking a final decision which entailed sometime resulting in the filing of the appeal on March 01, 2018.

3. Mr. Ramji Srinivasan endeavor was to highlight that the aforesaid facts cannot be said to be accentuated by any inaction much less the deliberate one, in the delay. He also submitted the aforesaid facts suggest that all the authorities and bodies, who have taken part in the decision making process have exercised their independent mind after going through the files which approximately consisted of 1001 pages. He relied upon the judgment of the Supreme Court in the case of ***Collector, Land Acquisition, Anantnag vs. Katiji, AIR 1987 Supreme Court 1353*** to contend that the provision of Section 5 of the Limitation Act has been enacted by the legislature in order to enable the Courts to do substantial justice to the parties by disposing of the matters on merits. According to him, the expression *"sufficient cause"* employed by the legislature is adequately elastic to enable the Courts to apply law in a meaningful manner which subserves

the ends of justice.

4. It was also the submission of Mr. Ramji Srinivasan that no prejudice is caused to respondent No.12 M/s Young Builders Pvt. Limited inasmuch as no rights of the said respondent are frustrated if the delay is condoned. Even after elapse of 3 years 19 days of the impugned judgment of the learned Single Judge, not a single brick is laid for construction at the project site in question and when the repercussion for the proposed construction is violation of certain rights of public at large in addition to specific bars contained in MPD-2021, it is essential that the matter is heard on merits. He also stated that the appellant University being in public service, any relief to the appellant will benefit public at large and neither any explanation was offered by the respondent No.12 justifying the public purpose for which the land in question was acquired from the Ministry of Defence and subsequently used for parking nor disclosed the identities of the members of the Group Housing Society for whose benefit the respondents have sought to prevail over the vital interest of the appellant and beneficiaries of its perpetual service.

5. In substance it is his submission that important question affecting public interest cannot be defeated on technical

objections raised by the builder who has not laid even a single brick till date. According to him, the site in question, given the vast traffic congestion in the nearby area, was used for parking and it has been stopped for no reason thus causing an unbearable disservice to society. He also stated that the site in question was originally owned by the Ministry of Defence and the site was acquired for *"public purpose"* at *"public expense"* but it has fallen into the hands of a private builder through a dubious and illegal process.

6. Finally, it is his submission that the cause of delay was unintentional due to the appellant's limitation being public body to ensure a fair decision making process through Executive Council and the absence of Vice Chancellor both fall beyond the control of the University and shall not deprive a better cause to be lost on mere technicalities when no prejudice let alone the disadvantage suffered by the private builder as they themselves have allowed the time period *"free from any pending lis"* to be wasted for the reasons best known to them.

7. On the other hand, Mr. Arvind Nigam, learned Senior Counsel appearing for the respondent No.12 has drawn our attention to the reply filed by the said respondent to the

application and submitted that the present application for condonation of delay is liable to be dismissed on the sole ground that no justification, let alone *"sufficient cause"* whatsoever is offered by the appellant herein for delay of more than 1,013 days in filing the present appeal as the statutory period of the 30 days expired on May 26, 2015 itself under clause 4 of Part A(a) of Chapter 1, Volume V of the Delhi High Court Rules.

8. According to him, the reasons given for delay in filing the appeal are not only vague and lacks in material particulars but are also incorrect. The appellant is seeking condonation of delay more than 1000 days on the ground that the Apex Body of the appellant could not convene a meeting to decide on the appeal and hence, due to the said reason approval for filing the appeal could not be taken. It is submitted that the public institutions / government bodies such as Delhi University are under a special obligation to ensure that they perform their duties with diligence and commitment. The bureaucratic delay and inactions cannot be a ground to seek condonation of delay. A perusal of the application would reveal that there was no bona fide effort on part of the appellant to file the present appeal and explanation that the file was kept pending for several months / years due to

considerable degree of procedural red-tapism and approval cannot be ground for condonation of delay in filing appeal.

9. It is also submitted that apart from above, the falsity of stand of appellant is evident from the fact that during the period 2015 till December 2017, appellant has filed at least 27 writ petitions and 11 Letters Patent Appeals before this Court as per official website of this Court. In addition to the above, 392 cases were filed against the appellant and the same were defended by the appellant before this Court, which is evident from print out of website of this Court i.e. Annexure-R-1 of reply filed by the respondent No.12.

10. He stated that similarly, during said period, at least 31 number of cases were either filed by the Delhi University before the Supreme Court or defended by it. Hence, to allege that due to non-availability of Vice Chancellor or non-convening of meeting appeal could not be filed is incorrect and in fact a deliberate false statement. Further, if contention of the appellant is taken to be correct, if appears that no proceeding or work or decision has been taken by the appellant during the period, for which condonation of delay is sought. Even as per admissions in the application by appellant, there has been gross negligence and

deliberate inaction as well as lack of bona fides on part of the appellant University.

11. It is submitted that in Para 3(F) of application, even as per best case of the appellant, the appellant got alleged approval on February 28, 2017 / March 07, 2017 for filing appeal but there is no explanation as to why the said appeal was not filed immediately thereafter and was filed after more than a year (approx.363 days) from said alleged approval, which was filed only on March 01, 2018. The appellant is under obligation to explain each and every day of the delay but in the present case, there is no explanation at all. It is submitted that on this ground alone, application for condonation of delay is liable to be dismissed. He also stated that it is settled law that the condonation of delay cannot be a matter of course and that the State / Public bodies like Delhi University cannot claim any preferential or special treatment. The Government departments are under a special obligation to ensure that they perform their duties with diligence and commitment. Condonation of delay is an exception and should not be used as an anticipated benefit for Government department. He would rely upon the judgments of the Supreme Court in ***Post Master General & Ors. vs. Living***

Media India Ltd. & Anr. (2012) 3 SCC 563; Basawaraj & Anr. vs. The Spl. Land Acquisition Officer AIR 2014 SC 746 *and* ***Union of India & Ors. vs. Prithwi Singh & Ors. Diary No.8754 of 2018*** to contend that the alleged justification of the appellant on account of inherited bureaucratic methodology of making several notes, transferring files, passing resolutions, convening meetings cannot be accepted, which binds everybody, including appellant University.

12. According to him, the present application is nothing but an abuse of process of law and a dilatory tactics. It is important to mention that even the writ petition was also filed by the appellant with delay of more than 7-8 years. In fact, the learned Single Judge has also taken note of the said fact and dismissed the writ petition also on the ground of delay and laches. A perusal of contents of the application would reveal that even as per their own admission appellant not only acted in negligent manner but also there is not a single explanation for delay in filing the present appeal, which can be said to be sufficient cause or reason, which was beyond control of the appellant. He seeks the dismissal of the application and also the appeal.

13. The DMRC has also filed reply to the application through

its counsel Mr. Tarun Johri. It is the case of the DMRC that the appeal filed after a delay of 1006 days does not explain the reasons which actually led to the delay in filing the appeal. It is stated that only vague averments in the application for condonation of delay have been made without submitting documentary proof of the same which are not admissible in the eyes of law. The DMRC seeks the dismissal of the application.

14. Mr. Rajiv Bansal, learned Senior Counsel appearing for the respondent No.3 DDA submitted that no justification, let alone sufficient cause has been offered by the appellant University for delay of more than 1000 days in filing the Appeal. He seeks the dismissal of the application on the sole ground that the reasons given for delay in filing the appeal are vague and the same also demonstrate lackadaisical approach of the appellant and even otherwise it is a settled proposition of law that departmental delay on account of non moving file from one department / officer to another cannot be a sufficient cause for condoning abnormal delay of more than 1000 days. According to Mr. Bansal the condonation of delay cannot be allowed as matter of routine and that the State / Public bodies like Delhi University cannot claim any preferential or special treatment. They are

under obligation to ensure that they performed their duties with due diligence and commitment.

15. Reference is made to the judgment of the Supreme Court in the case of ***Post Master General & Ors.(supra)*** and ***Basawaraj & Anr.(supra).*** In the end the DDA seeks the dismissal of the application resultantly the appeal as well.

16. Having heard the learned counsel for the parties, suffice to state in substance the reasons given by the University for the delay is because of the due procedure followed in the matter and the time taken by the democratically elected Executive Council for taking a decision for final course of action after consulting all the stakeholders as such the delay is neither willful nor deliberate nor intentional.

17. From the facts stated above, it is a conceded position that the copy of the impugned judgment dated April 27, 2015 was received by the University in the month of May 2015. A plea has been taken that the position of the Vice Chancellor had become vacant on October 28, 2015 which is after five months of the receipt of the judgment from the Counsel. But much before that the limitation period had expired. Surely, the University consisting of a Law Department, and battery of Lawyers, was

aware of the limitation period, for filing an appeal. When the judgment was received, the Vice Chancellor was in place, so also the Executive Council but still no action was taken. The plea that a case file comprising of 1000 pages was required to be examined is also an excuse as it cannot be denied that the writ petition itself was filed by the University to which counter affidavits have been filed by the parties which would have been duly examined by the University before filing the rejoinders. Further, the writ petition must have been argued by the Counsel after due deliberations with the officers of the University. It cannot be said that the case file was examined for the first time after the impugned judgment had come.

18. So the plea that in the absence of Vice Chancellor the decision to file appeal could not have been taken cannot be accepted.

19. Even after the appointment of the new Vice Chancellor in October 2018, the plea that he had constituted a committee for proposing the line of action and further consideration of the issue by the Executive Council and further consultation with the other stakeholders including the consideration of representations by the Equal Opportunity cell is a process which is unheard of more

particularly for taking a decision to file an appeal. It is only a ploy to justify the delay.

20. The application for condonation of delay and the written submissions does not refer to the dates on which representations have been received from the individuals as well as groups of the University which were forwarded to the Equal Opportunity cell for consideration. In any case, the Equal Opportunity cell gave its report on April 28, 2017 and whereas the appeal was filed on March 01, 2018. The explanation given by the University justifying this period does not inspire confidence.

21. The submission of Mr. Nigam that between the period 2015 till December 2017 the appellant University had filed at least 27 Writ Petitions and 11 LPAs before this Court as seen from the official website, is appealing. In addition, the submission of Mr. Nigam that 392 cases were filed against the appellant University which have been defended by the appellant University before this Court and at least 31 number of cases were either filed by the Delhi University before the Supreme Court or defended by it, is also appealing.

22. The aforesaid has not been denied by the appellant University in its rejoinder which suggest that the plea of non

availability of Vice Chancellor because of which decision could not been taken for filing an appeal is an incorrect stand taken by the appellant University. So the reasons given by the University being not bonafide and do not inspire confidence, the same cannot be accepted.

23. Mr. Nigam is justified in relying upon the judgment of the Supreme Court in the case of Post master General & Ors. (supra) wherein in Paras 28 ad 29 the supreme Court has held as under:

> *"28. Though we are conscious of the fact that in a matter of condonation of delay when there was no gross negligence or deliberate inaction or lack of bonafide, a liberal concession has to be adopted to advance substantial justice, we are of the view that in the facts and circumstances, the Department cannot take advantage of various earlier decisions. The claim on account of impersonal machinery and inherited bureaucratic methodology of making several notes cannot be accepted in view of the modern technologies being used and available. The law of limitation undoubtedly binds everybody including the Government.*
>
> *29. In our view, it is the right time to inform all the government bodies, their agencies and instrumentalities that unless they have reasonable and acceptable explanation for the delay and there*

was bonafide effort, there is no need to accept the usual explanation that the file was kept pending for several months/years due to considerable degree of procedural red-tape in the process. The government departments are under a special obligation to ensure that they perform their duties with diligence and commitment. Condonation of delay is an exception and should not be used as an anticipated benefit for government departments. The law shelters everyone under the same light and should not be swirled for the benefit of a few."

24. Similarly in the case of Basawaraj & Anr. (supra) the Supreme Court in Paras 12 and 15 held as under:

"12. The Court has no power to extend the period of limitation on equitable grounds. "A result flowing from a statutory provision is never an evil. A Court has no power to ignore that provision to relieve what it considers a distress resulting from its operation." The statutory provision may cause hardship or inconvenience to a particular party but the Court has no choice but to enforce it giving full effect to the same. The legal maxim "dura lex sed lex" which means "the law is hard but it is the law", stands attracted in such a situation. It has consistently been held that, "inconvenience is not" a decisive factor to be considered while interpreting a

statute.

15. The law on the issue can be summarized to the effect that where a case has been presented in the court beyond limitation, the applicant has to explain the court as to what was the "sufficient cause" which means an adequate and enough reason which prevented him to approach the court within limitation. In case a party is found to be negligent, or for want of bonafide on his part in the facts and circumstances of the case, or found to have not acted diligently or remained inactive, there cannot be a justified ground to condone the delay. No court could be justified in condoning such an inordinate delay by imposing any condition whatsoever. The application is to be decided only within the parameters laid down by this court in regard to the condonation of delay. In case there was no sufficient cause to prevent a litigant to approach the court on time condoning the delay without any justification, putting any condition whatsoever, amounts to passing an order in violation of the statutory provisions and it tantamount to showing utter disregard to the legislature."

25. The reliance placed by Mr. Srinivasan on the judgment of the Supreme Court in the case of ***Collector, Land Acquisition***

Anantnag (supra) is concerned, the facts are that an appeal preferred by the State of Jammu & Kashmir arising out of a decision enhancing compensation in respect of acquisition of land for a public purpose to the extent of Rs.14 lakhs by making an upward revision to the tune of 800%, which also raised important question as regards principles of valuation, was dismissed as time barred being four days beyond time. The application for condonation of delay was allowed upon satisfaction of the Court that sufficient cause existed, that too of four days. The said judgment shall not be applicable in the facts of this case, which according to us does not inspire confidence as such not bonafide, to hold that sufficient cause has been shown by the University seeking condonation of delay.

26. That apart, we also note that the learned Single Judge had also rejected the writ petition on the ground of delay and laches. Even the other respondents like DMRC / DDA have sought dismissal of the application as the same does not depict sufficient cause for the appellant University to approach after almost 900 days i.e. after more than two and a half years.

27. In view of above discussion, we do not see any reason to condone the delay of 916 days in filing the appeal. The

application is dismissed. Resultantly, the appeal as well as connected applications are also dismissed.

V. KAMESWAR RAO, J

CHIEF JUSTICE

OCTOBER 29, 2018*/aky*

HIGH COURT OF DELHI
सत्यमेव जयते

969-A

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
APPEAL NO. 17 OF 2021

IN THE MATTER OF:

UNIVERSITY OF DELHI ... APPELLANT

VERSUS

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE & ORS ... RESPONDENTS

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ANNEXURE -R6

(2020) 13 Supreme Court Cases 745

(BEFORE R. BANUMATHI, A.S. BOPANNA AND HRISHIKESH ROY, JJ.)

UNIVERSITY OF DELHI .. Appellant;

Versus

UNION OF INDIA AND OTHERS .. Respondents.

Civil Appeals Nos. 9488-489 of 2019†, decided on December 17, 2019

Constitution of India — Arts. 226 and 227 — Condonation of delay vis-a-vis public interest — Approach of courts — Insufficiency of routine explanation — "Sufficient cause" should be indicated to justify delay — Every day's delay need not be explained but reasonable and acceptable explanation is very much necessary — Accrued right to opposite party cannot be dealt with lightly

On facts held, there was no sufficient cause made out for delay and matter also hit by laches — Cumulative effect of delay and laches cannot be ignored — Hence, High Court justified in declining to condone delay — If at this stage delay is condoned, it would be against public interest — Limitation Act, 1963 — S. 5 — Practice and Procedure — Delay/Laches/Limitation

Respondent 3 was permitted by the Delhi Development Authority to construct high rise multistorey building in control zone of the appellant. Permission was allowed for construction on plot that was leased out to the Delhi Metro Rail Corporation by segregating that plot. The appellant raised several contentions against this construction one of them was that construction was against the Master Plan Delhi 2021. The appellant challenged this action in writ petition. The Single Judge rejected the writ petition on ground of delay and laches. Later, the Executive Council of the appellant recommended to file intra-court appeal. Therefore, the letters patent appeal came to be filed after delay of 910 days along with an application for condonation of delay. The Division Bench rejected the application for condonation of delay without considering merits of the matter. Hence these appeals.

Dismissing the appeals, the Supreme Court

Held:

In the instant case, considering that the Division Bench of the High Court has dismissed the LPA on the ground of delay of 910 days, that aspect of the matter would require consideration at the outset and the facts on merits are noted to the limited extent to find out whether in that background the public interest would suffer. (Para 14)

University of Delhi v. Union of India, 2018 SCC OnLine Del 12885, *considered*

By and large, a liberal approach is to be taken at the matter of condonation of delay. The consideration for condonation of delay would not depend on the status

† Arising out of SLPs (C) Nos. 2581-82 of 2019. Arising from the Judgment and Order in *University of Delhi v. Union of India*, 2018 SCC OnLine Del 12885 (Delhi High Court, CM No. 865 for 918 in LPA No. 854 of 2018 dt. 01.01.2018)

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of the party, namely, the Government or the public bodies so as to apply a different yardstick but the ultimate consideration should be to render even-handed justice to the parties. Even in such case the condonation of long delay should not be automatic since the accrued right or the adverse consequence to the opposite party is also to be kept in perspective. In that background while considering condonation of delay, the routine explanation would not be enough but it should be in the nature of indicating "sufficient cause" to justify the delay which will depend on the backdrop of each case and will have to be weighed carefully by the courts based on the fact situation. (Para 33)

Delay Kalyan Light Railway Co. Ltd. v. District Board, Bhojpur, (1993) 2 SCC 398; *Postmaster General v. Living Media India Ltd.*, (2012) 3 SCC 563 : (2012) 2 SCC (Civ) 327 : (2012) 2 SCC (Cri) 580 : (2012) 1 SCC (L&S) 616, *followed*

LIC v. Kanoo, (1981) 2 SCC 105, *distinguished on facts*

The delay in the instant facts in filing the LPA is 916 days and as such the consideration to condone can be made only if there is reasonable explanation and the condonation cannot be merely because the appellant is public body. The entire explanation depicts the casual approach unmindful of the law of limitation despite being aware of the position of law. That apart when there is such a long delay and there is no proper explanation, laches would also come into play while reckoning as to the manner in which a party has proceeded before filing an appeal. In addition in the instant facts not only the delay and laches in filing the appeal is contended on behalf of the respondents seeking dismissal of the instant appeal but it is also contended that there was delay and laches in filing the writ petition itself at the first instance from which the present appeal had arisen. (Para 34)

The entire explanation for the inordinate delay of 916 days is twofold i.e. the non availability of the Vice Chancellor due to retirement and subsequent appointment of new Vice-Chancellor, also that the matter was placed before the Executive Council and a decision was taken to file the appeal and the said process had caused the delay. The reasons as stated do not appear very convincing since the situation was of availing the appellate remedy and not the original proceedings requiring such deliberation when it was a mere continuation of the proceedings which had already been filed on behalf of the appellant herein, after due deliberation. Significantly, the Vice-Chancellor who was at the helm of affairs when the writ petition was filed, prosecuted and disposed of on 27-4-2015 was available in the same office till 28-10-2015, for about six months which was a long enough period as compared to 30 days' limitation period for filing appeal. In that circumstance when the said Vice-Chancellor who had prosecuted the writ petition was available, the submission of the learned Senior Counsel for the appellant that unseen hurdles are likely to have prevented the filing of the appeal also cannot be accepted. Secondly, the reason sought to be put forth about the decision required to be taken by the Executive Council is also not acceptable when it was just the matter of filing the appeal. In fact, in the writ petition an affidavit was filed referring to Resolutions 56 and 173 of Academic Council and Executive Council authorising for filing writ petition. When the writ petition was filed based on such authorisation and the stand of the appellant, as the writ petitioner was put forth and had failed in the writ petition, it cannot be accepted that the appellant with all the wherewithal

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was unable to file the appeal, that too when the same Vice-Chancellor was available for six months after dismissal of the writ petition. Hence the reasons put forth cannot in our opinion constitute sufficient cause. (Para 25)

The approval from the Executive Council was obtained on 28-5-2011 [1], 3-6-2011 [2], the appeal was ultimately filed on 1-3-2018 after an year from the said date which only indicates the casual approach which is now sought to be overcome with the plea of public interest despite there being no explanation for the delay at every stage. It is true that every day's delay need not be explained with such precision but the fact remains that a reasonable and acceptable explanation is very much necessary. The Division Bench apart from noticing these aspects had also noted that the learned Single Judge too found the writ petition to be hit by delay and laches. (Para 26)

DDA v. Kalu, (1987) 2 SCC 107 *referred to*

In that regard there can be no dispute to the fact that Respondent 13 being aggrieved by the decision of DDA had filed a petition bearing WP No. 3135 of 2010 assailing the letter dated 19-8-2009 and the same was disposed of only on 18-5-2011 but the appellant cannot take shelter under the same to explain the laches. This is because much water had flown under the bridge before the said development and those events ought to have triggered action from the appellant in challenging, more so when there were other litigations relating to the same subject, as noticed in the order of the learned Single Judge. (Para 28 and 27)

Young Buddies (P) Ltd. v. Union of India, 2011 SCC OnLine Del 5207; *University of Delhi v. Union of India*, 2015 SCC OnLine Delhi 6911 *cited*

In the present matter, the land was converted to residential use in 2005 and Respondent 11, DMRC had invited bids and public auction was conducted on 28-7-2008 which ought to have awakened the appellant herein for the first time since the fact of conversion of the land into residential development was in public domain even if it is assumed that the earlier process of approval, etc. by the DDA on the approval request of DMRC are internal processes and could not be known to the appellant. In fact, the learned Single Judge while taking note of the challenge raised by the appellant herein has also taken note of an earlier petition bearing WP (C) No. 8675 of 2011 filed by the Association of Metro Commuters wherein also the residential development was an issue which came to be dismissed by order dated 14-12-2011. Similarly, another petition in WPs (C) Nos. 6624-25 of 2012, though challenging the acquisition was filed, the same was also dismissed. Thereafter the writ petition of the appellant filed in the year 2012 was pending till it was disposed of on 27-4-2015. (Para 29)

Assn. of Metro Commuters v. DMRC, 2011 SCC OnLine Del 5383; *TLR*, (2012) 2 Tax LR 172; *Sanjay Khanna v. Union of India*, 2013 SCC OnLine Del 3668; (2013) 198 DLT 353; *University of Delhi v. Union of India*, 2015 SCC OnLine Del 9065, *cited*

Despite the writ petition having been filed belatedly in respect of certain actions which had commenced in the year 2005 and even though the writ petition was filed after obtaining approval of the Executive Council, no steps were taken to file the writ appeal for 916 days after disposal of the writ petition. In such circumstances, the cumulative effect of the delay and laches cannot be ignored. Though the contention is put forth that the delay is required to be condoned since

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public interest is involved, the nature of the proceedings that have taken place thus far would indicate that the matter has been examined at different stages in the earlier litigations and if the grounds on which the appellant was asserting the action of the respondents were to be examined on merits, they ought to have been more diligent in prosecuting the matter before the Court. (Para 30)

In the matter of condonation of delay and laches, the well-accepted position is also that the accrued right of the opposite party cannot be lightly dealt with. In that regard, rather than taking note of the hardship that would be caused to Respondent 13 as contended by the learned Senior Counsel, what is necessary to be taken note of is the manner in which Respondent 11, DMRC has proceeded in the matter. Respondent 11, DMRC is engaged in providing the public transport and for the said purpose the Government through policy decision has granted approval to generate resources through property development and in that regard the development as earlier indicated, is taken up. Pursuant thereto Respondent 11 has received a sum of Rs 218.20 crores from Respondent 13 as far back as in the year 2008. The said amount as indicated is used for its projects providing metro rail service to the commuting public. In such circumstance, if at this stage the inordinate delay is condoned irrespective of the lackadaisical manner in which the appellant has proceeded in the matter, it would also be contrary to public interest. (Para 31)

Therefore, taking into consideration all these aspects of the matter, not only the learned Single Judge was justified in holding that the writ petition inter alia is hit by delay and laches but the decision of the Division Bench in dismissing the LPA on the ground of delay of 916 days is also justified and the orders do not call for interference. Accordingly, the appeals stand dismissed. (Paras 32 and 33)

Paramjit Oberoi v. Union of India, 2018 SCC OnLine Del 12055; *Oberoi Realty Ltd. v. Union of India*, 2015 SCC OnLine Del 9019, *approved*

Atul Singh v. Union of India, 2010 SCC OnLine Del 2685 : (2010) 171 DLT 218 : 2010 (117) DRJ 1, *overruled*

C. D06312018SV

Advocates who appeared in this case:

Tushar Mehta, Solicitor General, A.N.S. Nadkarni, Additional Solicitor General, Mohan Parasaran, Ranjit Kumar, Arvind Sinha, Shyam Divan, Gopi Krishna Kamat, S. Venkataramani and Ms Meenakshi Arora, Senior Advocates (Mohinder Rawal, Purnima N. Awasthy, Ojas Vishnu Kumar Swaroop Singh, Praveesh Thakur, Ms Nitya Sinha, Gautham, Shivshanker Tarun John, S.S. Rebello, Ms Aakanksha Kaul, D.L. Chidananda, Pathuli Singh, Arvind Kumar Sharma, Raj Bahadur Mahesh Agarwal, Abhinav Agarwal, Anirudh Bhan, Rohan Talwar, P.C. Agarwala, Ms Rini Jain, Praveen Swarup, Sundhar Singh and Ashutosh Tiwari, Advocates, for the appearing parties.

Chronological list of cases cited *on page(s)*

1 2018 SCC OnLine Del 12055, *Oberoi Realty Ltd. v. Union of India* 719-j, 722-g, 759-g

2 2015 SCC OnLine Del 9019, *Oberoi Realty Ltd. v. Union of India* 720-a, 750-d, 753-e, 758-b-c, 759-c, 759-f, 760-a, 760-g

3 2013 SCC OnLine Del 3565 : (2013) 201 DLT 353 : 2013 SCC OnLine DRT 353, *Sanjay Khanna v. Union of India* 760-d

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4. (2012) 3 SCC 568 : (2012) 2 SCC (Civ) 327 : (2012) 2 SCC (Cri) 580 : (2012) 71 ACC 61 : 2012 SCC OnLine SC 690 *Pratibha Co-operative Housing Society Ltd.* (SCJ) g
5. 2011 SCC OnLine Del 5353 : ILR (2011) 2 Del 772 *Assn. of Mono Commuters* v. *DDRC* 760(c) f
6. 2011 SCC OnLine Del 5207 *Young Builders (P) Ltd.* v. *Union of India* 760(b), 760(c)
7. 2015 SCC OnLine Del 2698 : (2015) 221 DLT 218 *Anil Singh* v. *Union of India* 756(d) e
8. (1992) 2 SCC 598 *Delhi Rohtas Light Railway Co. Ltd.* v. *District Board, Rohtas* 757(c) b
9. (1988) 2 SCC 1 : 1 ACC 1 *Kasu* 756(a), 758(c), 759(g)

The Judgment of the Court was delivered by

A.S. BOPANNA, J. — Leave granted. These appeals have been preferred by the appellant University of Delhi through its Registrar to challenge the common judgment and order dated 29-10-2018[1] whereby the High Court of Delhi declined to condone the delay of 916 days in filing the appeal to challenge the judgment dated 27-4-2015[2] whereunder the learned Single Judge had dismissed WP (C) No. 2743 of 2012 filed by the University of Delhi. c

2. The challenge in the writ petition was, inter alia, to the decision dated 12-5-2011 of the Delhi Development Authority (hereinafter referred to as "DDA" for short) who had allowed Respondent 13, M/s Young Builders (P) Ltd. to construct a high-rise multistorey private housing society in the control zone of Zone-O in the University campus, without any height restriction. The construction permission was allowed on the plot leased out to the Delhi Metro Rail Corporation (hereinafter referred to as "DMRC" for short) by permitting segregation of 2 ha as a separate entity from the total 3 ha of land acquired for the metro station. d e

3. The principal contentions of the appellant University on the merits of the challenge were as follows:

3.1. The permission sought by Respondent 13 [namely, M/s Young Builders (P) Ltd.] for the proposed construction of a group housing society on the land originally owned by the Ministry of Defence in the University enclave is violative of MPD 2021 and is against the larger public interest, given the fact that the project site in question and its vicinity are within the North Campus of the University and that it contains various historical and archaeological buildings, apart from it being the centre of higher education and advanced learning. f g

3.2. The change in the character of the subject land is impermissible in law, since the land having been acquired for public purpose for construction of the metro rail project, has suddenly been diverted to private commercial use and auctioned to private builder for building a group housing society in a manner h

1 *University of Delhi* v. *Union of India*, 2018 SCC OnLine Del 12885
2 *University of Delhi* v. *Union of India*, 2015 SCC OnLine Del 9869

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contrary to the purpose and charter of incorporation of the Delhi Metro Rail Corporation (DMRC).

3.3. The restriction on certain developments for Metro Station prescribed under Master Plan of Delhi 2021 ("MPD" for short) was also a contention raised by the writ petitioner which imposed ban on construction of high rise buildings in the control zone of Delhi University. The location of various ladies' hostels of the University in close vicinity of the proposed construction site was highlighted as an important privacy concern. The impediment to access of thousands of students, teachers at the entrance of the University was the other main contention raised in the writ petition.

4. On the other hand, DMRC had projected that after construction of the University Metro Station, 2 ha of land remained surplus and the housing project was intended to generate revenue for DMRC as per the policy of the Government. The formal application made to the authorities for change of land use and approval secured for conversion of the land for residential use, was also highlighted by DMRC.

5. The learned Single Judge having noticed the entire sequence refused to entertain the writ petition of the University including on the ground of delay and laches. In the judgment dated 27-1-2015[2] the Court however observed that DDA is the master of the formulation and implementation of the Master Plan and, necessary approvals have been taken from various statutory authorities for the housing project. It was also observed that the change in the land use from "public" to "residential" is permissible by adverting to the Delhi High Court's Division Bench judgment in *Ashok Singh* v. *Union of India*[3]. According to the writ court, since it was a policy decision taken by the government body and since the appellant University has failed to demonstrate any illegality, impropriety, mala fide in the decision making by the authority, interference of the Court with the policy decision, would not be justified.

6. It is the case of the appellant that following the dismissal of the writ petition and being concerned about the future use of the subject land, the University Authorities constituted a Committee to recommend the appropriate course of action to be taken by the University. The Committee's report furnished on 11-11-2016 is stated to have been laid before the Executive Council of the University and after due consideration of the report and the judgment of the Learned Single Judge, the Executive Council of the University through their Resolution dated 28-2-2017/7-3-2017 decided to prefer an intra-court appeal in the High Court.

7. While the above deliberations were on, accessibility concern to the University's Metro Station area was raised under the Rights of Persons with Disabilities Act, 2016 by persons with disabilities. The University also received a report on preventive measures to be taken in the accident-prone area of the

2. *University of Delhi* v. *Union of India*, 2015 SCC OnLine Del 6546.
3. 2010 SCC OnLine Del 1698 : (2010) 171 DLT 318.

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metro station. With these and other projection, the appeal in LPA No. 89 of 2018 came to be filed on 1-3-2018 after a delay of 916 days, together with CM No. 8054 of 2018 for condonation of delay in filing the appeal.

8. The delay of 916 days caused in preferring the appeal was explained in the application seeking delay condonation and the rejoinder to the reply to the said application to the following effect:

8.1. Non-convening of Executive Council and delay occasioned due to non-availability of Vice-Chancellor. The case in the present LPA is different from other routine litigation preferred or contested by the appellant. It is the only case where, the approval from the Executive Council of the University of Delhi was required to be taken and before such approval, various deliberations preceded so as to appraise the Executive Council of the different shades of the subject-matter. Being a statutory body, an adherence to the just method of decision-making requires consultations with affected departments of the University itself and therefore, the final say in the matter rests with the Executive Council which is constituted under Section 21 of the Delhi University Act, 1922. The Council includes the seniormost Deans, democratically elected representatives of teachers, the visitor's nominee, the Registrar, and the Vice Chancellor.

8.2. The judgment of the learned Single Judge was sent by the counsel representing the University quite late and it was, then, placed before the Legal Cell of the University for examining the matter. After going through the voluminous paper book, it was opined that the matter be referred to the Vice Chancellor for consideration and pursuant thereto, a meeting was held, wherein it was decided that the matter needs to be dealt with holistically, having regard to all the issues decided and connotations thereof. The issue could not be taken up for consideration as the post of Vice Chancellor had fallen vacant w.e.f. 28-10-2015 and could be considered only after the new Vice Chancellor had assumed office and taken stock of things. On 16-3-2016, the new Vice Chancellor joined the office and in order to ensure democratic functioning of the University, it decided to constitute a Committee comprising of senior faculty persons representing different sections of the University. The terms of reference of the Five member Committee were, to recommend the course of action to the University in the light of the dismissal of the writ petition filed by the University in DMRC matter.

8.3. On 11-11-2016, the above constituted Committee gave its Report. Based on the Report of the five member Committee, it was decided by the competent authority that the subject matter of the present case be referred to the Executive Council of the University for its final decision. In the Executive Council meeting held on 28-2-2017, the matter was discussed. The item was again discussed in the Executive Council meeting held on 7-3-2017 (continued meeting), where the members of the Council referred to the earlier discussions and decisions of both the Academic Council and the Executive Council with respect to the same matter and it was decided unanimously to prefer an appeal

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against the order of the learned Single Judge dated 27-4-2018[2] after adequate preparation.

8.4. In the meanwhile, reservation was strongly put forth by the disabled students and faculty in the light of the proposed project by the private builder at the very main entrance of the University of Delhi. Such representations were received from individuals as well as groups which the University had to consider and were therefore forwarded to the Equal Opportunity Cell for consideration. The Equal Opportunity Cell, University of Delhi, which looks after the welfare of disabled students and others, in the light of the new enactment on the Rights of Persons with Disabilities Act, 2016, analysed the probable outcome. After detailed deliberations, the Equal Opportunity Cell submitted its report on 28-4-2017 which was brought to the notice of the competent authorities for their consideration. The report was considered at various levels of the University including the Office of the Dean, Student Welfare, the Department of Legal Affairs, the Office of the Proctor, the Engineering Department, and the Department of Environmental Studies. Holding discussions and deliberations among these bodies and considering their inputs involved further time and it involved coordination and interaction with various authorities and stakeholders. All this exercise involved a further period of five to six months before a considered opinion could be generated by the University of Delhi. Hence the representations and the Report of the Equal Opportunity Cell could be finally considered by the University of Delhi around the end of year 2017.

8.5. In the interregnum, the accidents occurred at Chhatra Marg in December 2017 led to the need for the preparation of a report by the Office of the Proctor of the University dated 5-2-2018 wherein the Proctor recommended the area to be declared as accident prone. Both the reports — one by the Equal Opportunity Cell and the other by the Office of Proctor — were sent to the counsel concerned who was holding the brief for the preparation of the appeal memorandum. Subsequently legal opinion was sought and the draft appeal and petition was prepared which was thereafter got vetted and settled by the Senior Counsel. The finalised appeal was thereafter again considered at the highest level of the University to take the final decision, which entailed some time. On 1-8-2018, the LPA was filed before the Delhi High Court.

9. The above explanation for the delayed filing however not accepted and the Division Bench of the High Court on 29-10-2018[3] dismissed the LPA on the ground of delay without considering the merits of the appeal. Thus, aggrieved the appellant University has filed this appeal.

10. Shri Mohan Parasaran, learned Senior Counsel for the appellant submits that the implication of the rejection of the writ petition and the LPA without considering the substantial contention raised by the University on merits would

2. *University of Delhi* v. *Union of India*, 2018 SCC OnLine Del 6548.
3. *University of Delhi* v. *Union of India*, 2018 SCC OnLine Del 12585.

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cause grave injury to the public institution. The learned Senior Counsel submits that the University Authorities have been pursuing the issue with due diligence but decision had to be taken after consultation with all the stakeholders and therefore, the delay in preferring the LPA should not be attributed to any inaction, much less a deliberate inaction. The endeavour of the courts according to Shri Parasaran should be to do substantial justice to the parties by deciding the matters on merits but in the present case, neither the learned Single Judge nor the Division Bench of the High Court had considered the merit of the contention raised by the appellant University.

11. Shri Parasaran argues that the expression "sufficient cause" is elastic enough to enable the courts to apply the law of limitation in a meaningful manner. He also projects that since the builders are yet to start their construction, the delayed filing of the LPA should not have resulted in non-consideration of the contention on merits, as major public interest issues have been raised in the present matter. The learned Senior Counsel argues that important questions effecting public interest cannot be defeated on technical objection, inasmuch as the proposed site for construction was originally owned by the Defence Ministry and the land was acquired for public purpose at public expense but is now sought to be given over to a private builder, for a profit-oriented motive. The said contentions are also supplemented by Shri R. Venkataramani and Shri Ranji Seshasan, learned Senior Advocates.

12. Ms Meenakshi Arora, learned Senior Counsel representing the applicants/interveners submits that six girl hostels are located near to the project site and if high rise apartments are allowed to be constructed, the privacy of the hostel residents would be compromised. Ms Arora also refers to the letter dated 28-10-1943 of the Joint Secretary, Government of India, Department of Education addressed to the Chief Commissioner of Delhi conveying the decision of the Government of India to ensure that no tall buildings are erected inside the Delhi University campus and also the necessity of protecting University area, as an enclave. The Senior Counsel then refers to the Zonal Development Plan for Zone-"C" (Civil Lines Zone) of the DDA as approved by the Ministry of Urban Development to point out that the authorities have recognised the existence of number of old historical buildings of the colonial period within the Delhi University campus and effort should be made to convert Delhi University into an integrated campus with restriction on tall buildings.

13. Shri Shyam Divan, learned Senior Counsel for Respondent 13, M/s Young Builders would at the outset contend that though the learned Senior Counsel for the appellant has referred to the merits of the case, keeping in view the position that the Division Bench of the High Court has dismissed the LPA on the ground of delay and laches, that aspect of the matter would require consideration at the threshold. He would assert that the delay of 916 days is an inordinate delay of more than two-and-a-half years and in such event the principle of applying the usual test for "sufficient cause" would not arise as it is not merely the number of days requiring condonation but also amounts to

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laches in filing the writ petition, as well as the LPA. Mere contention that the proceedings initiated by the appellant is in public interest would not advance the case inasmuch as the learned Single Judge having adverted to all these aspects has arrived at the conclusion that the petition suffers from laches in addition to there being no merit and in such circumstance when the LPA was once again delayed by 910 days the Division Bench was justified in its conclusion. It is pointed out that the said delay of 910 days is as against the period of 30 days which is allowed in law for filing the LPA.

14. It is contended by Shri Divan that the cause of action if any should be construed on 23-9-2005 when the area was converted into residential, but the writ petition was filed only on 7-5-2012 and despite the writ petition having been disposed of on 27-4-2015[*] the LPA was filed only on 1-3-2018 after a delay of 910 days. The reason assigned that a decision to file the LPA could not be taken as the office of Vice Chancellor had fallen vacant also cannot be accepted since such vacancy arose only on 28-10-2015 while the writ petition had already been disposed of on 27-4-2015[*] and there was sufficient time to file the LPA if they had the intention to do so.

15. The learned Senior Counsel further refers to the large number of cases that were filed on behalf of the University during the said period. It is contended that while considering condonation of delay the prejudice that would be caused to the opposite side is also one of the aspects to be considered. If that situation is kept in view, in the instant case the request for proposal in favour of Respondent 13 was notified on 23-6-2008 and the letter of acceptance was issued on 13-8-2008 and the lease being for 90 years, already 11 years have passed and by such belated proceedings the project is prejudicially hampered. Respondent 13 has already spent Rs 233 crores being the lease amount paid to DMRC and also for securing appropriate approvals. It is contended that Respondent 13 had to face earlier litigation as well which has been taken note of by the learned Single Judge and the respondent cannot be exposed to such repeated litigations.

16. Shri Tushar Mehta, the learned Solicitor General appearing on behalf of Respondent 1, DMRC has contended that the Ministry of Urban Development as a matter of policy of the Government of India had permitted DMRC to generate its own resources through property development and has accordingly permitted to carry out property development on the land transferred to it by the Government. In such event when DMRC has taken such steps not only in the instant case but also in several other projects, any interference at this stage more particularly when there is belated challenge of the present nature, it would have a serious impact on the projects undertaken. It was submitted that due to certain changes effected in the manner in which the Metro Rail Project was to be implemented there was some excess land which has been put to use to generate resources for the project and in that regard when there is a contractual

[*] *Laxmi Narain Dube v. Union of India*, 2015 SCC OnLine Del 13819 (DB).

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relationship with Respondent 13 if the much belated petition is entertained at this stage, there would be a great financial impact which is also a loss to the public exchequer and in such event the public interest would be better served by not condoning the delay in such matters. Moreover, it is not a case of mere delay in filing the LPA but is a serious case of laches. It is also noticed by the learned Single Judge that the writ petition itself was filed after 7-8 years and in such event if the discretionary orders passed in the writ jurisdiction are interfered with in the limited jurisdiction of this Court, it would set a bad precedent.

17. Shri A.N.S. Nadkarni, learned Additional Solicitor General would also refer to the aspect of delay and laches and supplement the arguments advanced by the learned Solicitor General. He would further contend that the Union of India being the owner of the land which was acquired does not have objection for the project and in such event interference at the instance of the appellant herein would not be justified. Ms Binu Tamta, learned counsel submitted in support of the contentions raised by the respondents.

18. Shri Mohan Parasaran, learned Senior Counsel in reply to the said contentions would reiterate the contentions put forth relating to the explanation of delay and would contend that the conclusion of the learned Single Judge that the writ petition was hit by laches is fallacious inasmuch as Respondent 13 themselves had filed a writ petition raising certain disputes with regard to the limit of FAR through the Notification dated 20.1.2005 and such challenge by Respondent 13 had come to an end on 18.8.2011 and the NOC, etc. were obtained subsequently, after which the writ petition was filed by the appellant herein in the year 2012. Hence the delay and laches has been explained and it is not a case of negligence. It is contended that the stand of DMRC that it would be put to financial loss cannot be accepted at this point since the question as to whether they would be liable to pay interest or not are matters which would have to be considered in appropriate proceedings. Hence, he contends that the High Court ought to have condoned the delay and the matter should have been considered on its merits.

19. Though we have exhaustively referred to the pleadings and the contentions of the parties, including contentions put forth on merits, the same is only for completeness and to put the matter in perspective before considering the issue relating to delay and laches. In the instant case, considering that the Division Bench of the High Court has dismissed the LPA on the ground of delay of 916 days, that aspect of the matter would require consideration at the outset and the facts on merits are noted to the limited extent to find out whether in that background the public interest would suffer.

20. The learned Senior Counsel for the appellant in order to impress upon this Court the principle relating to consideration of "sufficient cause" for condonation of delay and the factors that are required to be kept in view, has

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relied on the decision in *LIC* v. *Ajaib*[1] wherein it is held as hereunder: (SCC pp. 108-09, para 3)

> "3. The legislature has conferred the power to condone delay by enacting Section 5[2] of the Limitation Act, 1963 in order to enable the courts to do substantial justice to parties by disposing of matters on "merits". The expression "sufficient cause" employed by the legislature is adequately elastic to enable the courts to apply the law in a meaningful manner which subserves the ends of justice — that being the life purpose for the existence of the institution of courts. It is common knowledge that this Court has been making a justifiably liberal approach in matters instituted in this Court. But the message does not appear to have percolated down to all the other courts in the hierarchy. And such a liberal approach is adopted on principle as it is realised that:
>
> 1. Ordinarily a litigant does not stand to benefit by lodging an appeal late.
>
> 2. Refusing to condone delay can result in a meritorious matter being thrown out at the very threshold and cause of justice being defeated. As against this when delay is condoned the highest that can happen is that a cause would be decided on merits after hearing the parties.
>
> 3. "Every day's delay must be explained" does not mean that a pedantic approach should be made. Why not every hour's delay, every second's delay? The doctrine must be applied in a rational common sense pragmatic manner.
>
> 4. When substantial justice and technical considerations are pitted against each other, cause of substantial justice deserves to be preferred for the other side cannot claim to have vested right in injustice being done because of a non-deliberate delay.
>
> 5. There is no presumption that delay is occasioned deliberately, or on account of culpable negligence, or on account of mala fides. A litigant does not stand to benefit by resorting to delay. In fact he runs a serious risk.
>
> 6. It must be grasped that judiciary is respected not on account of its power to legalise injustice on technical grounds but because it is capable of removing injustice and is expected to do so.

[1] (1987) 2 SCC 107

[2] "Any appeal or any application, other than an application to which the provisions of Order XXI of the Code of Civil Procedure, 1908, may be admitted after the prescribed period if the appellant satisfies the court that he had sufficient cause for not preferring the appeal or making the application within such period."

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Making a justice-oriented approach from this perspective, there was sufficient cause for condoning the delay in the institution of the appeal. The fact that it was the "State" which was seeking condonation and not a private party was altogether irrelevant. The doctrine of equality before law demands that all litigants, including the State as a litigant, are accorded the same treatment and the law is administered in an even-handed manner. There is no warrant for according a step-motherly treatment when the "State" is the applicant praying for condonation of delay. In fact experience shows that on account of an impersonal machinery (no one in charge of the matter is directly hit or hurt by the judgment sought to be subjected to appeal) and the inherited bureaucratic methodology imbued with the note-making, file-pushing and passing-on-the-buck ethos, delay on its part is less difficult to understand though more difficult to approve. In any event, the State which represents the collective cause of the community, does not deserve a litigant non grata status. The courts therefore have to be informed with the spirit and philosophy of the provision in the course of the interpretative of the expression "sufficient cause". So also the same approach has to be evidenced in its application to matters at hand with the end in view to do even handed justice on merits in preference to the approach which scuttles a decision on merits. Turning to the facts of the matter giving rise to the present appeal, we are satisfied that sufficient cause exists for the delay. The order of the High Court dismissing the appeal before it as time barred, is therefore, set aside. Delay is condoned. And the matter is remitted to the High Court. The High Court will now dispose of the appeal on merits after affording reasonable opportunity of hearing to both the sides." (emphasis in original)

21. Further the decision in *Dehri Rohtas Light Railway Co. Ltd. v. District Board, Bhojpur*[5] is relied upon, wherein this Court has indicated the real test to determine the delay is that the petitioner should come to Court before a parallel right is created and that the lapse of time is not attributable to any laches or negligence.

22. The learned Senior Counsel for Respondent 13, on the other hand, has relied upon the decision in *Postmaster General v. Living Media (India) Ltd.*[6] wherein it is held as hereunder: (SCC p. 574, paras 28-29)

"28. Though we are conscious of the fact that in a matter of condonation of delay when there was no gross negligence or deliberate inaction or lack of bona fides, a liberal concession has to be adopted to advance substantial justice, we are of the view that in the facts and circumstances, the Department cannot take advantage of various earlier decisions. The claim on account of impersonal machinery and inherited bureaucratic methodology of making several notes cannot be accepted in view of

5 (1992) 2 SCC 548
6 (2012) 3 SCC 563 : (2012) 2 SCC (Cri) 1 : (2012) 2 SCC (L&S) 580 : (2012) 1 SCC (L&S) 619

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the modern technologies being used and available. The law of limitation undoubtedly binds everybody, including the Government.

29. In our view, it is the right time to inform all the government bodies, their agencies and instrumentalities that unless they have reasonable and acceptable explanation for the delay and there was bona fide effort, there is no need to accept the casual explanation that the file was kept pending for several months/years due to considerable degree of procedural red tape in the process. The government departments are under a special obligation to ensure that they perform their duties with diligence and commitment. Condonation of delay is an exception and should not be used as an anticipated benefit for the government departments. The law shelters everyone under the same light and should not be swirled for the benefit of a few."

23. From a consideration of the view taken by this Court through the decisions cited supra the position is clear that, by and large, a liberal approach is to be taken in the matter of condonation of delay. The consideration for condonation of delay would not depend on the status of the party, namely, the Government or the public bodies so as to apply a different yardstick but the ultimate consideration should be to render even handed justice to the parties. Even in such case the condonation of long delay should not be automatic since the accrued right or the adverse consequence to the opposite party is also to be kept in perspective. In that background while considering condonation of delay, the routine explanation would not be enough but it should be in the nature of indicating "sufficient cause" to justify the delay which will depend on the backdrop of each case and will have to be weighed carefully by the courts based on the fact situation. In *Katiji*[1] the entire conspectus relating to condonation of delay has been kept in focus. However, what cannot also be lost sight of is that the consideration therein was in the background of dismissal of the application seeking condonation of delay in a case where there was delay of four days pitted against the consideration that was required to be made on merits regarding the upward revision of compensation amounting to 80%.

24. As against the same, the delay in the instant facts in filing the LPA is 916 days and as such the consideration to condone can be made only if there is reasonable explanation and the condonation cannot be merely because the appellant is public body. The entire explanation noticed above, depicts the casual approach unmindful of the law of limitation despite being aware of the position of law. That apart when there is such a long delay and there is no proper explanation, laches would also come into play while noticing as to the manner in which a party has proceeded before filing an appeal. In addition in the instant facts not only the delay and laches in filing the appeal is contended on behalf of the respondents seeking dismissal of the instant appeal but it is also contended that there was delay and laches in filing the writ petition itself

[1] (1987) 2 SCC 107

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at the first instance from which the present appeal had arisen. In that view, it would be necessary for us to advert to those aspects of the matter and notice the nature of consideration made in the writ petition as well as the LPA to arrive at a conclusion as to whether the High Court was justified.

25. The entire explanation for the inordinate delay of 917 days is twofold i.e. the non availability of the Vice Chancellor due to retirement and subsequent appointment of new Vice Chancellor, also that the matter was placed before the Executive Council and a decision was taken to file the appeal and the said process had caused the delay. The reasons as stated do not appear very convincing since the situation was of availing the appellate remedy and not the original proceedings requiring such deliberation when it was a mere continuation of the proceedings which had already been filed on behalf of the appellant herein after due deliberation. Significantly, the Vice Chancellor who was at the helm of affairs when the writ petition was filed, prosecuted and disposed of on 27-4-2015[2] was available in the same office till 28-10-2015, for about six months which was a long enough period as compared to 90 days' limitation period for filing appeal. In that circumstance when the said Vice-Chancellor who had prosecuted the writ petition was available, the submission of the learned Senior Counsel for the appellant that unseen hands are likely to have prevented the filing of the appeal also cannot be accepted. Secondly, the reason sought to be put forth about the decision required to be taken by the Executive Council is also not acceptable when it was just the matter of filing the appeal. In fact, in the writ petition an affidavit was filed referring to Resolutions 50 and 174 of Academic Council and Executive Council authorising for filing writ petition. When the writ petition was filed based on such authorisation and the stand of the appellant, as the writ petitioner was put forth and had failed in the writ petition, it cannot be accepted that the appellant with all the wherewithal was unable to file the appeal, that too when the same Vice-Chancellor was available for six months after dismissal of the writ petition. Hence the reasons put forth cannot in our opinion constitute sufficient cause.

26. That apart, as rightly noticed by the Division Bench in the LPA, the approval from the Executive Council was obtained on 28-2-2017/7-3-2017, the appeal was ultimately filed on 1-3-2018 after an year from the said date which clearly indicates the casual approach which is now sought to be overcome with the plea of public interest despite there being no explanation for the delay at every stage. It is true that as held in *Ramlal*[4] that every day's delay need not be explained with such precision but the fact remains that a reasonable and acceptable explanation is very much necessary. The Division Bench apart from noticing these aspects had also noted that the learned Single Judge too found the writ petition to be hit by delay and laches.

2. *University of Delhi* v. *Union of India*, 2015 SCC OnLine Del 9869
4. *Ramlal* v. *Rewa*, (1962) 1 SCC 197

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27. In that backdrop, a perusal of the order dated 27-4-2015[2] passed by the learned Single Judge would indicate that the learned Single Judge in para 65 of the order with reference to his earlier observation has arrived at the categorical conclusion that the petition suffers from laches and has been filed with delay of 7-8 years. The learned Senior Counsel for the appellant while seeking to dispel such conclusion by the learned Single Judge contended that Respondent 13 themselves had filed a writ petition being aggrieved by the restricted FAR and the said writ petition was disposed of only on 18-5-2011[3] and the need for the appellant herein to file the writ petition arose only thereafter. The said contention is also not acceptable if the entire sequence is noticed.

28. In that regard there can be no dispute to the fact that Respondent 13 being aggrieved by the decision of DDA had filed a petition bearing WP No. 3135 of 2010 assailing the letter dated 19-8-2009 and the same was disposed of only on 18-5-2011[3] but the appellant cannot take shelter under the same to explain the laches. This is because much water had flown under the bridge before the said development and those events ought to have triggered action from the appellant in challenging, more so when there were other litigations relating to the same subject, as noticed in the order of the learned Single Judge.

29. In the present matter, the land was converted to residential use in 2005 and Respondent 11, DMRC had invited bids and public auction was conducted on 28-7-2008 which ought to have awakened the appellant herein for the first time since the fact of conversion of the land into residential development was in public domain even if it is assumed that the earlier process of approval, etc. by the DDA on the approval request of DMRC are internal processes and not be known to the appellant. In fact, the learned Single Judge while taking note of the challenge raised by the appellant herein has also taken note of an earlier petition bearing WP (C) No. 8675 of 2011 filed by the Association of Metro Commuters wherein also the residential development was an issue, which came to be dismissed by order dated 11-12-2012[4]. Similarly, another petition in WPs (C) Nos. 9634-35 of 2012, though challenging the acquisition was filed, the same was also dismissed[5]. Thereafter the writ petition of the appellant filed in the year 2012 was pending till it was disposed of on 27-4-2015[2].

30. Despite the writ petition having been filed belatedly in respect of certain actions which had commenced in the year 2005 and even though the writ petition was filed after obtaining approval of the Executive Council, no steps were taken to file the writ appeal for 916 days after dismissal of the writ petition. In such circumstance, the cumulative effect of the delay and laches cannot be ignored. The decisions referred by the learned Senior Counsel for the appellant

2. *University of Delhi* v. *Council of India*, 2015 SCC OnLine Del 9629.
3. *Young Builders (P) Ltd.* v. *Union of India*, [illegible] SCC OnLine [illegible] 5761.
4. *Assn. of Metro Commuters* v. *DMRC*, 2012 SCC OnLine Del 5283 : ILR (2012) 2 Del 132.
5. *Sanjay Khurana* v. *Union of India*, 2013 SCC OnLine Del 4968 : (2013) 198 DLT 554.

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noted supra cannot, therefore, be applied in the present facts and circumstances inasmuch as the consideration hereunder was not merely the explanation for the delay of few days in filing the appeal. Though contention is put forth that the delay is required to be condoned since public interest is involved, the nature of the proceedings that have taken place thus far would indicate that the matter has been examined at different stages in the earlier litigations and if the grounds on which the appellant was assailing the action of the respondents were to be examined on merits, they ought to have been more diligent in prosecuting the matter before the Court.

31. In the matter of condonation of delay and laches, the well accepted position is also that the accrued right of the opposite party cannot be legally dealt with. In that regard, rather than taking note of the hardship that would be caused to Respondent 13 as contended by the learned Senior Counsel, what is necessary to be taken note of is the manner in which Respondent 11, DMRC has proceeded in the matter. Respondent 11, DMRC is engaged in providing the public transport and for the said purpose the Government through policy decision has granted approval to generate resources through property development and in that regard the development as earlier indicated, is taken up. Pursuant thereto Respondent 11 has received a sum of Rs 218.20 crores from Respondent 13 as far back as in the year 2008. The said amount as indicated is used for its projects providing metro rail service to the commuting public. In such circumstances, if at this stage the inordinate delay is condoned unmindful of the lackadaisical manner in which the appellant has proceeded in the matter, it would also be contrary to public interest.

32. Therefore, taking into consideration all these aspects of the matter, we are of the opinion that not only the learned Single Judge was justified in holding that the writ petition inter alia is hit by delay and laches but the decision of the Division Bench in dismissing the LPA on the ground of delay of 910 days is also justified and the orders do not call for interference.

33. Accordingly, the appeals being devoid of merits stand dismissed with no order as to costs. All pending applications shall stand disposed of.

ANNEXURE-R7

Relevant EC issued for Residential Projects in Delhi during 2017-2021						Project Details as per EC / TOR								Critical Areas				Co-ordinates	
	Project Proponent		EC Granted			Area (Sqm)			Numbers					Distance (Mtr) as per Google Maps				Latitude	Longitude
S.No.	Name	Location	EIA 2006 - Schedule		Date	Plot Size	Built up	Height (Mtr)	Basements	Floors	Units	Parkings	Population	Najaf Drain	Yamuna	Patel Chest	North Ridge		
A	Civil Lines (Zone-C)		Item	Category															
1	Northern India Paint	Canal Road	8(a)	B2	29.06.2021	5,288.50	32,133.77	81.10	1	22	102	298	540	62	2720	790	1270	28°41'21.01"N	77°12'04.69"E
2	Godrej Green (per TOR)	Ashok Vihar	8(b)	B1	17.06.2021	78,710.00	3,47,102.00	100.00	2	37	1822	3308	7200	840	4700	2800	3080	28°41'14.29"N	77°10'47.55"E
3	Negolice India (M2K)	Azadpur	8(b)	B1	13.01.2021	18,372.74	1,72,855.62	235.00	3	65	775	1801		2890	5310	3640	4200	28°42'22.14"N	77°10'38.59"E
4	Parsvnath Developers	Khyber Pass	8(b)	B1	14.07.2020	68,158.35	2,55,562.00	125.65	3	40	895	3256		1220	613	1360	425	28°41'45.91"N	77°13'18.67"E
5	North Delhi Metro Mall	Khyber Pass	8(b)	B1	15.11.2019	45,709.45	1,60,375.07	44.10	4	10		1894		1290	784	1120	76	28°41'37.67"N	77°13'16.06"E
6	Delhi Flour Mills	Roshanara Road	8(a)	B2	17.09.2019	17,515.00	1,32,957.00	165.00	3	46	622	1143		1930	2920	2560	558	28°40'05.18"N	77°12'15.07"E
7	Young Builders Pvt Ltd	Cavalry Lane	8(a)	B2	21.05.2021	20,000.00	1,37,879.64	145.30	2	39	446	860	2302	450	1800	460	500	28°41'39.79"N	77°12'52.00"E
B	Other Zones																		
8	DLF Home Developers	Shivaji Marg	8(b)	B1	11.10.2019	1,00,686.00	10,00,726.78	179.22	4		4762	8836						28°39'59.60"N	77°09'39.52"E
9	DCM Ltd	Kishanganj	8(b)	A	19.09.2017	1,60,780.36	10,05,604.38	180.00	3			9858						28°39'37.43"N	77°11'46.14"E

MINISTRY OF JAL SHAKTI

(Department Of Water Resources, River Development And Ganga Rejuvenation)

(CENTRAL GROUND WATER AUTHORITY)

NOTIFICATION

New Delhi, the 24th September, 2020

S.O. 3289(E).—WHEREAS, on the directions of Hon'ble Supreme Court vide its order dated the10th December, 1996 passed in Civil writ Petition No 4677 of 1985, MC Mehta Vs Union of India, the Central Government constituted the Central Ground Water Authority (hereafter referred to as the 'Authority') vide notification number S.O. 38 (E), dated the 14th January, 1997 to exercise powers under Section 5 of the Environment (Protection) act, 1986 (29 of 1986) for the purposes of regulation and control of Ground Water management and development and to exercise certain powers and perform certain functions relating thereto;

AND WHEREAS, the Authority has been regulating ground water development and management by way of issuing 'No Objection Certificates' for ground water extraction to industries or infrastructure projects or Mining Projects etc., and framed guidelines in this connection from time to time in twenty two States and two Union territories, where ground water development is not being regulated by the State Government Union Territory administration concerned;

AND WHEREAS, some of the State Governments or, Union territories enacted legislations and issued regulatory directions or orders for regulating ground water development and management;

AND WHEREAS, the Hon'ble National Green Tribunal, New Delhi vide order dated the 15th April 2015 in OA Nos. 204/205/206 of 2014 has issued directions to the Authority to ensure that any person operating tube-well, or any means to extract ground water shall obtain permission from the Authority and shall operate the same subject to the law in force, even if such unit is existing unit or the unit is yet to be established;

AND WHEREAS, the said Hon'ble Tribunal vide its order dated the 09th July, 2015 in OA Nos. 34 and 37 of 2014 directed all industrial units which are members of the Common Effluent Treatment Plants (CETPs) to approach the Authority through State Pollution Control Board for obtaining 'No Objection Certificate' in accordance with the law;

AND WHEREAS, the aforesaid Hon'ble Tribunal vide order dated the 13th July, 2017 in OA No 200- of 2014 directed that every industry should be directed to pay for extraction of such water, that too, subject to the conditions stated in the order permitting such extraction;

AND WHEREAS, the said Hon'ble Tribunal vide its order dated the 28th August, 2018 in O.A. Nos. 176 of 2015 and 59 of 2012 respectively directed the Ministry of Water Resources, River Development and Ganga Rejuvenation to forthwith review the existing mechanism so as to ensure effective steps for conserving the groundwater resources;

AND WHEREAS, in pursuance of the directions of the Hon'ble National Green Tribunal and powers conferred by sub-section (3) of section 3 and section 5 of the Environment (Protection) Act, 1986 the Authority, with a view to protect the ground water resources had circulated the draft guidelines for grant of 'No Objection Certificate' on the 11th October, 2017 inviting comments and suggestions from all the stakeholders;

AND WHEREAS, all objections and suggestions received in response to the said draft guideline have been duly considered by the Central Government, the Authority notified the guidelines to regulate groundwater over-exploitation and to conserve the groundwater resources in the country vide notification number S.O. 6140 (E), dated the 12th December, 2018;

AND WHEREAS, the aforesaid Hon'ble Tribunal vide order dated the 03rd January 2019 in the OA No. 176 of 2015 directed that the above mentioned notification dated the 12th December, 2018 may not be given effect to as it is unsustainable if tested on 'Precautionary Principle, Sustainable development as well as Inter-generational Equity Principles' and if implemented, will result in fast depletion of groundwater and damage to water bodies and will be destructive of the fundamental right to life under Article 21 of the Constitution of India;

AND WHEREAS, the said Hon'ble Tribunal vide order dated the 11th September, 2019 constituted a committee to deliberate on steps for preventing depletion of groundwater, robust monitoring mechanism

against unauthorised extractions and fulfillment of 'No Objection Certificate' conditions, environment compensation etc and to submit a report;

AND WHEREAS, the aforesaid committee submitted the report along-with draft guidelines to regulate groundwater extraction and groundwater conservation in Hon'ble Tribunal on the 16th March, 2020;

AND WHEREAS, the above said Hon'ble Tribunal vide order dated the 20th July, 2020 directed to comply with certain points for sustainable groundwater management while issuing 'No Objection Certificates' to commercial establishments by the Authority;

Now therefore, in pursuance of the directions of Hon'ble National Green Tribunal and the powers conferred by sub-section (3) of Section 3 read with Section 5 of the Environment (Protection) Act, 1986 (29 of 1986), the Department of Water Resources, River Development & Ganga Rejuvenation, hereby notifies the guidelines to regulate and control groundwater extraction in the country in supersession to this Ministry notification vide S.O. 6140 (E), dated the 12th December, 2018 as per the Schedule below:

SCHEDULE

Guidelines to regulate and control ground water extraction in India

(with immediate effect)

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[F. No. CGWA-21/4/2020-CGWA]

ASHISH KUMAR, Director

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Guidelines to regulate and control groundwater extraction in India

Preamble and Background:

On the directions of Hon'ble Supreme Court vide its order dated 10th December, 1996 passed in Civil writ Petition No 4677 of 1985, MC Mehta Vs Union of India, the Central Government had constituted the Central Ground Water Board as Authority vide notification number S.O. 38 (E), dated the 14th January, 1997 to exercise powers under sub section (3) of section 3 of the Environment (Protection) act, 1986 (29 of 1986) for the purposes of regulation and control of Ground Water Management and Development and to exercise certain powers and perform certain functions as per the said Act.

The Authority has been regulating ground water development and management by way of issuing 'No Objection Certificates' for ground water extraction to industries or infrastructure projects or Mining Projects etc., and framed guidelines in this connection from time to time applicable in twenty two States and two Union territories, where ground water development is not being regulated by the State Government and Union territory administration concerned.

To have sustainable management of water resources in the country groundwater abstraction guidelines have been prepared to regulate groundwater extraction and conserve the scarce groundwater resources in the country.

These guidelines will come into force with immediate effect from the date of Gazette Notification and will supersede all earlier guidelines issued by the Central Ground Water Authority (CGWA).

These guidelines will have pan India applicability. Ground water abstraction in States/ Uts (which are not regulating ground water abstraction) shall continue to be regulated by Central Ground Water Authority.

Further, wherever States/ Uts have come out with their own groundwater abstraction guidelines, which are inconsistent with the CGWA guidelines, the provisions of CGWA guidelines will prevail. However, in case the guidelines followed by such States/ Uts contain some more stringent provisions than CGWA guidelines, such provisions may also be given effect to by the States/ Uts Authorities in addition to those contained in the CGWA guidelines. States may be at liberty to suggest additional conditions/ criteria based on the local hydro-geological situations which shall be reviewed by CGWA/Ministry of Jal Shakti, Government of India before acceptance.

All new/existing industries, industries seeking expansion, infrastructure projects and mining projects abstracting ground water, unless specifically exempted under Para 1.0 below, will be required to seek No Objection Certificate from Central Ground Water Authority or, the concerned State/ UT Ground Water

Authority as the case may be. The entire process of grant of No Objection Certificate shall be online through a web based application system.

Water management plans shall be prepared by all the State Ground Water Authorities/ Organizations for all Over-exploited, Critical and Semi-critical assessment units starting with Over-exploited units. Water management plans shall be reviewed and updated periodically. Water management plans, data on water availability and scarcity and policy framed in this regard shall be placed on the websites of Central Ground Water Authority/ State Ground Water Authority.

1.0 Exemptions from seeking No Objection Certificate:

Following categories of consumers shall be exempted from seeking No Objection Certificate for ground water extraction:

(i) Individual domestic consumers in both rural and urban areas for drinking water and domestic uses.

(ii) Rural drinking water supply schemes.

(iii) Armed Forces Establishments and Central Armed Police Forces establishments in both rural and urban areas.

(iv) Agricultural activities.

(v) Micro and small Enterprises drawing ground water less than 10 cum/day.

1.1 Registration of Drilling Rigs

State / Ut Governments shall be responsible for registering drilling rigs operating within their jurisdiction and for maintaining the database of wells drilled by them. Appropriate link shall be provided in CGWA portal for making the data available to CGWA.

2.0 Drinking & Domestic use for Residential apartments/ Group Housing Societies/ Government water supply agencies in urban areas

For grant of No Objection Certificate for ground water extraction, the project proponent has to furnish the details as per the guidelines issued by the CGWA in proper format as available in CGWA website. No Objection Certificate for new /existing wells shall be granted only in such cases where the local Government water supply agency is unable to supply requisite amount of water in the area.

No Objection Certificate shall be granted subject to the following specific conditions:

i) Installation of Sewage Treatment Plants shall be mandatory for all residential apartments/ Group Housing Societies where ground water requirement is more than 20 m^3/day. The water from Sewage Treatment Plants shall be utilized for toilet flushing, car washing, gardening etc.

ii) The No Objection Certificate shall be valid for a period of five years from the date of issue or till such time local Government water supply is provided to the project area, whichever is earlier. In case the project proponent receives water supply from the concerned local Government Water Supply Agency during the validity of the No Objection Certificate, intimation regarding availability of public water supply shall be sent by the project proponent to CGWA and No Objection Certificate will be cancelled by the Authority. In other cases, the project proponent will apply for renewal of No Objection Certificate, ninety days before the expiry of No Objection Certificate.

iii) Proponents shall be liable to pay ground water abstraction charges for the quantum of ground water proposed to be extracted, as per rates mentioned in Table 5.1.

Documents to be submitted with the application

a) Details of water requirement computed as per National Building Code, 2016 **(Annexure I)**, taking into account recycling/ reuse of treated water for flushing etc.

b) Affidavit on non-judicial stamp paper of Rs. 10/- by the applicant, confirming non/ inadequate availability of public water supply in case of users requiring ground water up to 10 m^3/ day for drinking/ domestic use.

c) Certificate of non-availability of water from local government water supply agency in cases requiring ground water in excess of 10 m^3/ day for drinking/ domestic use. Government water supply agencies

applying for No Objection Certificate shall submit copy of government approval of the scheme/ project proposed to be implemented.

d) Ground water quality data of existing bore well/ tube well/ dug well from any National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited laboratory or Govt. approved laboratory (in case of existing projects applying for no objection certificate)

e) Proposal for rain water harvesting/ recharge within the premises as per Model Building Bye Laws issued by Ministry of Housing & Urban Affairs.

3.0 Agriculture Sector

Agriculture sector is the backbone of the Indian economy. As per Minor Irrigation Census 2013-14, 87.86% of wells are owned by marginal, small and semi-medium farmers having land holding up to 4 hectares (ha). Around 9.18 % of wells are owned by medium farmers having land holding 4 – 10 ha and 2.96% of the wells are owned by big farmers having land holding more than 10 ha.

Considering the number of ground water abstraction structures, regulation of ground water in agriculture sector through a 'command and control' strategy will prove to be an arduous task. Therefore, a participatory approach for sustainable ground water management would be more productive.

States/Uts are advised to review their free/subsidized electricity policy to farmers, bring suitable water pricing policy and may work further towards crop rotation/diversification/other initiatives to reduce over-dependence on groundwater.

Agriculture sector shall be exempted from obtaining No Objection Certificate for ground water extraction.

4.0 Commercial Use

No new major industries shall be granted No Objection Certificate in over-exploited assessment areas except as per the policy guidelines.

Availability of ground water resources shall be given due regard while considering applications for grant of No Objection Certificate for commercial use.

Commercial entities extracting ground water shall be required to submit online annual water audit report including an audit of water use as mentioned in the relevant sections. CGWA/ State Ground Water Authority (SGWA) shall publish all such audit reports online.

CGWA/ SGWAs shall engage independent agencies to verify the compliance of No Objection Certificate conditions periodically.

4.1 Industrial Use

In Over-exploited assessment units, No Objection Certificate shall not be granted for ground water abstraction to any new industry except those falling in the category of Micro, Small and Medium Enterprises (MSME). However, No Objection Certificate for drinking/ domestic use for work force, green belt use by these new industries shall be permitted. Expansion of existing industries involving increase in quantum of ground water abstraction in over-exploited assessment units shall not be permitted. No Objection Certificate shall not be granted to new packaged water industries in Overexploited areas, even if they belong to MSME category.

No Objection Certificate for ground water extraction by industries shall be granted subject to the following specific conditions:

i) No Objection Certificate shall be granted only in such cases where local government water supply agencies are not able to supply the desired quantity of water.

ii) All industries shall be required to adopt latest water efficient technologies so as to reduce dependence on ground water resources.

iii) All industries abstracting ground water in excess of 100 m^3/d shall be required to undertake annual water audit through Confederation of Indian Industries (CII)/ Federation Indian Chamber of Commerce and Industry (FICCI)/ National Productivity Council (NPC) certified auditors and submit audit reports within three months of completion of the same to CGWA. All such industries shall be

required to reduce their ground water use by at least 20% over the next three years through appropriate means.

iv) Construction of observation well(s) (piezometer)(s) within the premises and installation of appropriate water level monitoring mechanism as mentioned in Section 15 shall be mandatory for industries drawing/ proposing to draw more than 10 m^3/day of ground water and. Monitoring of water level shall be done by the project proponent. The piezometer (observation well) shall be constructed at a minimum distance of 15 m from the bore well/production well. Depth and aquifer zone tapped in the piezometer shall be the same as that of the pumping well/ wells. Detailed guidelines for design and construction of piezometers are given in **Annexure II**. Monthly water level data shall be submitted to the CGWA through the web portal.

v) The proponent shall be required to adopt roof top rain water harvesting/ recharge in the project premises. Industries which are likely to pollute ground water (chemical, pharmaceutical, dyes, pigments, paints, textiles, tannery, pesticides/ insecticides, fertilizers, slaughter house, explosives etc.) shall store the harvested rain water in surface storage tanks for use in the industry.

vi) Injection of treated/ untreated waste water into aquifer system is strictly prohibited.

vii) Industries which are likely to cause ground water pollution e.g. Tanning, Slaughter Houses, Dye, Chemical/ Petrochemical, Coal washeries, other hazardous units etc. (as per CPCB list) need to undertake necessary well head protection measures to ensure prevention of ground water pollution **(Annexure III).**

viii) All industries drawing ground water in safe, semi-critical and critical assessment units shall be required to pay ground water abstraction charges as applicable as per Tables 5.2 A and 5.3 A.

ix) All existing industries drawing ground water in over-exploited assessment units shall be liable to pay ground water restoration charges as applicable as per Tables 5.2 B and 5.3 B.

Documents to be submitted with the application

(a) An affidavit on non judicial stamp paper of Rs. 10/- regarding non availability of water supply from local government agencies in cases where ground water requirement is up to 10 m^3/day.

(b) Certificate regarding non/ partial availability of fresh water/ treated waste water supply from the local government water supply agency in cases where requirement of ground water is more than 10 m^3/day.

(c) Ground water quality data of existing bore well/ tube well/ dug well from any NABL accredited laboratory or Govt. approved laboratory (in case of existing projects applying for No Objection Certificate)

(d) Water quality data of bore well/ tube well/ dug well in respect of existing industries from NABL accredited laboratories/Government approved laboratories.

(e) Proposal for rain water harvesting/ recharge within the premises as per Model Building Bye Laws issued by Ministry of Housing & Urban Affairs.

(f) **Impact Assessment report:** All projects extracting/proposing to extract ground water in excess of 100 m^3/day in Over-exploited, Critical and Semi-critical areas shall have to mandatorily submit impact assessment report of existing/ proposed ground water withdrawal on the ground water regime and also socio-economic impacts report prepared by accredited consultants. Pro-forma for the report is given in **Annexure IV.**

4.2 Mining Projects

All existing as well as new mining projects will be required to obtain No Objection Certificate for ground water abstraction. Since mining projects are location specific, there will be no ban on grant of No Objection Certificate for abstraction of ground water for such projects in over-exploited assessment units.

No Objection Certificate for mining projects shall be granted subject to the following specific conditions:

i) It shall be mandatory for all the mining industries to ensure that water available from de-watering operations is properly treated and should be gainfully utilized for supply for irrigation, dust

suppression, mining process, recharge in downstream and for maintaining e-flows in the river system.

ii) Construction of observation well(s) (piezometers) along the periphery in the premises, for monthly ground water level monitoring, shall be mandatory for mines drawing/ proposing to draw more than 10 m^3/day of ground water. Depth and aquifer zone tapped in the piezometer shall be commensurate with that of pumping well/ wells.

iii) In addition, the proponent shall monitor ground water levels by establishing observation wells (piezometers) in the core and buffer zones as specified in the No Objection Certificate.

iv) In case of coal and other base metal mining the project proponent shall use the advance dewatering technology (by construction of series of dewatering abstraction structures) to avoid contamination of surface water.

v) In addition to this, all mining units shall also monitor the water quality of mine seepage and mine discharge through NABL accredited/ Govt. approved laboratories and the same shall be submitted at the time of self compliance.

vi) All mining projects drawing ground water in safe, semi-critical and critical assessment units shall be required to pay ground water abstraction charges as applicable as per Tables 5.4 A.

vii) All mining projects drawing ground water in over-exploited assessment units shall be liable to pay ground water restoration charges as per Table 5.4 B.

Documents to be submitted with the application

(a) Mining plan approved by the concerned Govt. agency/ department.

(b) Proposal for rain water harvesting/ recharge within the premises as per Model Building Bye Laws issued by Ministry of Housing & Urban Affairs.

(c) Comprehensive report prepared by accredited consultant on ground water conditions in both core and buffer zones of the mine, depth wise and year wise mine seepage calculations, impact assessment of mining and dewatering on ground water regime and its socio-economic impact, details of recycling, reuse and recharge, reduction of pumping with use of technology for mining and water management to minimize and mitigate the adverse impact on ground water, based on local conditions. Format for report is given in **Annexure V.**

4.3 **Infrastructure projects:**

Since infrastructure projects are location specific, grant of No Objection Certificate to such projects located in over-exploited assessment units shall not be banned. New infrastructure projects/ residential buildings may require dewatering during construction activity and/ or use ground water for construction. In both cases, applicants shall seek No Objection Certificate from CGWA before commencement of work. However, in over-exploited assessment units, use of ground water for construction activity shall be permitted only if no treated sewage water is available within 10 km radius of the site. New as well as existing Infrastructure projects shall also be required to seek No Objection Certificate for abstraction of ground water.

No 'No Objection Certificate' shall be granted for extraction of groundwater for Water Parks, Theme Parks and Amusement Parks in over-exploited assessment units.

Indicative list of Infrastructure projects is given in Annexure VI.

The No Objection Certificate for ground water abstraction will be granted subject to the following specific conditions:

i) In case of infrastructure projects that require dewatering, proponent shall be required to carry out regular monitoring of dewatering discharge rate (using a digital water flow meter) and submit the data through the web portal to CGWA/SGWA as applicable. Monitoring records and results should be retained by the proponent for two years, for inspection or reporting as required by CGWA/ SGWA.

ii) Installation of Sewage Treatment Plants (STP) shall be mandatory for new projects, where ground water requirement is more than 20 m^3/day. The water from STP shall be utilized for toilet flushing, car washing, gardening etc.

iii) For infrastructure dewatering/ construction activity, No Objection Certificate shall be valid for specific period as per the detailed proposal submitted by the project proponent.

iv) All infrastructure projects drawing ground water in safe, semi-critical and critical assessment units shall be required to pay ground water abstraction charges as applicable as per Table 5.3 A.

v) All infrastructure projects (new/ existing) drawing ground water in over-exploited assessment units shall be liable to pay ground water restoration charges as per Table 5.3 B.

Documents to be submitted with the application

(a) In cases where dewatering is involved, submission of impact assessment report prepared by an accredited consultant on the ground water situation in the area giving detailed plan of pumping, proposed usage of pumped water and comprehensive impact assessment of the same on the ground water regime shall be mandatory. The report should highlight environmental risks and proposed management strategies to overcome any significant environmental issues such as ground water level decline, land subsidence etc.

(b) An affidavit on non judicial stamp paper of Rs. 10/- regarding non availability of water from any other source in case water is required for construction in safe and semi critical areas.

(c) Certificate from a government agency regarding non availability of treated sewage water for construction within 10 km radius of the site in critical and over-exploited areas.

(d) Certificate of non-availability of water from local government water supply agency in respect of all categories of assessments units for commercial use.

(e) Proposal for rain water harvesting/ recharge within the premises as per Model Building Bye Laws issued by Ministry of Housing & Urban Affairs.

(f) Details of water requirement computed as per National Building Code, 2016 **(Annexure I)**, taking into account recycling/ reuse of treated water for flushing etc. (in case of completed infrastructure projects for commercial use).

(g) Completion certificate from the concerned agency for infrastructure projects requiring water for commercial use.

5.0 Ground water abstraction/ restoration charges

All residential apartments/ group housing societies/ Government water supply agencies in urban areas shall be required to pay ground water abstraction charges.

All industries/mining/ infrastructure projects drawing ground water in safe, semi-critical and critical assessment units will have to pay ground water abstraction charges based on quantum of ground water extraction and category of assessment unit as per details given in this guideline.

All existing mining/ infrastructure projects and existing industries including MSME drawing ground water in over-exploited assessment units will have to pay ground water restoration charges based on quantum of ground water extraction. Further, new MSME, new infrastructure and new Mining projects in over exploited areas shall also be required to pay ground water restoration charges.

Existing industries, infrastructure units and mining projects which have installed/constructed artificial recharge structures in compliance of the conditions prescribed in the groundwater guidelines prevailing at the time of grant of No Objection Certificate or its renewal shall be eligible for a rebate of 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges, subject to their satisfactory performance and verification.

The revenue generated from the proposed water abstraction/ restoration charges shall be kept in a separate fund for implementation of site specific suitable demand/ supply side interventions.

5.1 **Rates of Ground water abstraction /restoration charges**

I. **Drinking and domestic use for residential apartments/ group housing societies/ Government water supply agencies in Urban areas**

All residential apartments/ Group Housing Societies requiring water only for drinking/domestic use requiring No Objection Certificate would pay ground water abstraction charges as per rates given below in **Table 5.1.**

Table 5.1 Ground Water Abstraction charges for Drinking & Domestic use.

Quantum of Groundwater withdrawal (m^3/month)	**Rate of ground water abstraction charges (Rs. per m^3)**
0-25	No charge
26-50	1.00
>50	2.00

Government water supply agencies and Government infrastructure projects shall pay Ground water abstraction Charges @ Rs. 0.50 per m^3.

II. **Packaged Drinking Water units**

Rates of ground water abstraction charges for packaged drinking water units in safe, semi-critical and critical assessment units are given in Table 5.2 A and those for ground water restoration charges in over-exploited assessment units are given in Table 5.2 B.

Table 5.2 A: Rates of ground water abstraction charges for packaged drinking water units (Rs per m^3)

S.No.	Category of area ↓ / Ground water use →	Quantum of ground water withdrawal				
		Up to 50m^3/day	51 to <200 m^3/day	200 to <1000 m^3/day	1000 to <5000 m^3/day	5000 m^3/day and above
1.	Safe	1.00	3.00	5.00	8.00	10.00
2.	Semi-critical	2.00	5.00	10.00	15.00	20.00
3.	Critical	4.00	10.00	20.00	40.00	60.00

Table 5.2 B: Rates of ground water restoration charges for packaged drinking water units (Rs per m^3)

S.No.	Category of area ↓ / Ground water use →	Quantum of ground water withdrawal				
		Up to 50 m^3/day	51 to <200 m^3/day	200 to <1000 m^3/day	1000 to <5000 m^3/day	5000 m^3/day and above
1.	Over-exploited (existing industries only)	8.00	20.00	40.00	80.00	120.00

III. **Other Industries & infrastructure projects**

Rates of ground water abstraction charges for other industries and infrastructure projects in safe, semi-critical and critical assessment units are given in Table 5.3 A and those for ground water restoration charges in over-exploited assessment units are given in Table 5.3 B.

Table 5.3 A: Rates of Ground Water abstraction charges for other industries & infrastructure projects (Rs per m^3)

S.No.	Category of area ↓ / Ground water use →	Quantum of ground water withdrawal			
		< 200 m^3/day	200 to <1000 m^3/day	1000 to <5000 m^3/day	5000 m^3/day and above
1.	Safe	1.00	2.00	3.00	5.00
2.	Semi-critical	2.00	3.00	5.00	8.00
3.	Critical	4.00	6.00	8.00	10.00

Table 5.3 B: Rates of ground water restoration charges for other industries & infrastructure projects (Rs per m^3)

S.No.	Category of area ↓ / Ground water use →	Quantum of ground water withdrawal			
		< 200 m^3/day	200 to <1000 m^3/day	1000 to <5000 m^3/day	5000 m^3/day and above
1.	Over-exploited (existing industries / new Industries as per the present Guidelines)	6.00	10.00	16.00	20.00

IV. **Mining projects**

Rates of ground water abstraction charges for mining, which are drawing ground water in safe, semi-critical and critical assessment units are given in Table 5.4 A and those for ground water restoration charges in case of projects drawing ground water in over-exploited assessment units are given in Table 5.4 B.

Table 5.4 A: Rates of ground water abstraction charges for mining (Rs. per m^3)

S.No.	Category of area ↓ / Ground water use →	Quantum of ground water withdrawal			
		< 200 m^3/day	200 to <1000 m^3/day	1000 to <5000 m^3/day	5000 m^3/day and above
1.	Safe	1.00	2.00	2.50	3.00
2.	Semi-critical	2.00	2.50	3.00	4.00
3.	Critical	3.00	4.00	5.00	6.00

Table 5.4 B: Rates of ground water restoration charges for mining (Rs. per m^3)

S.No.	Category of area ↓ / Ground water use →	Quantum of ground water withdrawal			
		< 200 m^3/day	200 to <1000 m^3/day	1000 to <5000 m^3/day	5000 m^3/day and above
1.	Over-exploited	4.00	5.00	6.00	7.00

6.0 Bulk Water Supply

All private tankers abstracting ground water and use it for supply as bulk water suppliers will now mandatorily seek No Objection Certificate for ground water abstraction. The bulk water suppliers through tankers drawing ground water in safe, semi-critical and critical assessment units shall pay groundwater abstraction charges as per the **Table-6.1 A.** The bulk water suppliers drawing ground water in over-exploited assessment units shall pay the groundwater restoration charges as per the **Table-6.1 B.** All tankers will have to install GPS based system for their monitoring of movement/area of operation.

Modalities for issue of No Objection Certificate for bulk/tanker water supplies shall be worked out in consultation with States/Uts and suitable guidelines in this regard will be framed and issued separately for the same.

Table-6.1A: Groundwater abstraction charges for Bulk/Tanker water supplies	
Category	Rate per m3 (in Rs.)
Safe	**10**
Semi Critical	**20**
Critical	**25**

Table-6.1B: Groundwater abstraction charges for Bulk/Tanker water supplies	
Category	Rate per m3 (in Rs.)
Over Exploited	**35**

7.0 Abstraction of Saline ground water

Abstraction of saline ground water in areas having either saline ground water at all depths or pockets of saline ground water in an otherwise fresh water area for use by industries/ dewatering by infrastructure/ mining projects including those located in over-exploited areas would be encouraged. Such industries shall be exempted from paying ground water abstraction charges.

The list of such assessment units having saline ground water at all depths as per the latest assessment of dynamic ground water resources will be made available by the CGWA in their website. However, due care shall be taken in respect of disposal of effluents by the units so as to protect the water bodies and the aquifers from pollution.

Detailed guidelines in this regard shall be prepared and issued separately.

8.0 Protection of Wetland Areas

The wet land areas in the country are very crucial as they are direct reflection of the presence of ground water in such areas. The protection of the wetland areas is being separately handled by the Wetland Authorities. Since ground water is very crucial for the survival of the wetland area, any excessive ground water development within the zone of wetland area would affect the volume of water in that wetland.

Projects falling within 500 m. from the periphery of demarcated wetland areas shall mandatorily submit a detailed proposal indicating that any ground water abstraction by the project proponent does not affect the protected wetland areas. Furthermore, before seeking permission from CGWA, the projects shall take consent/approval from the appropriate Wetland Authorities to establish their projects in the area.

9.0 General compliance conditions in No Objection Certificate

i. Installation of digital water flow meter (conforming to BIS/ IS standards) having telemetry system in the abstraction structure(s) shall be mandatory for all users seeking No Objection Certificate and intimation regarding their installation shall be communicated to the CGWA within 30 days of grant of No Objection Certificate through the web-portal.

ii. Proponents shall mandatorily get water flow meter calibrated on from an authorized agency once in a year.

iii. Proponents shall install roof top rain water harvesting & recharge systems in the project area.

iv. Proponents shall pay Ground Water Abstraction/ Restoration Charges based on quantum of ground water extraction as applicable as per the rates given in Section 6.

v. Construction of purpose-built observation wells (piezometers) for ground water level monitoring shall be mandatory as per Section 15. Water level data shall be made available to CGWA through web portal. Detailed guidelines for construction of piezometers are given in **Annexure-II.**

vi. Proponents shall monitor quality of ground water from the abstraction structure(s) once in a year. Water samples from bore wells/ tube wells / dug wells shall be collected during April/May every year and analysed in NABL accredited laboratories for basic parameters (cations and anions), heavy metals, pesticides/ organic compounds etc. Water quality data shall be made available to CGWA through the web portal.

vii. If the existing well becomes defunct due to mechanical failure within the validity period of No Objection Certificate, the user can construct a replacement well under intimation to CGWA on web portal. The defunct well shall be properly sealed **(Refer Annexure VII).** The user will be required to submit documentary proof in this regard. However, if the existing abstraction structures fails to yield water and he proponent desires to drill another tubewell in the same premises, prior permission of the Authority shall be required. If the replacement well is to be drilled in some different place, the proponent shall obtain fresh No Objection Certificate.

viii. Wherever feasible, requirement of water for greenbelt (horticulture) shall be met from recycled / treated waste water.

ix. In case of change of ownership, new owner of the industry will have to apply for incorporation of necessary changes in the No Objection Certificate with documentary proof within 60 days of taking over possession of the premises.

10.0 Monitoring of compliance of No Objection Certificate Conditions

To monitor the compliance of No Objection Certificate conditions, Central Ground Water Authority and State/ UT Ground Water Authorities shall take the following steps:

a. Suitable MIS will be developed for compliance monitoring.

b. District Collectors/Deputy Commissioners (DCs) /District Magistrates (DMs) are authorized to take enforcement measures like sealing of unauthorized ground water abstraction structures, disconnection of electricity, launching of prosecution against those violating the No Objection Certificate conditions and taking action for imposition of Environmental Compensation.

c. Technical officers of CGWB/ CGWA and State groundwater organizations are authorized to take actions with respect to monitoring and periodic inspections with the approval of competent authority.

d. In case of violation of any of the No Objection Certificate conditions, the proponents shall be liable to pay the penalties as per **Section 16.**

11.0 Renewal of No Objection Certificate

No objection certificate shall be renewed periodically, subject to the compliance of the conditions mentioned therein:

i. The applicant shall apply for renewal of No Objection Certificate at least ninety days prior to expiry of its validity.

ii. Application for renewal of No Objection Certificate shall be accompanied by the Compliance Report.

iii. Before granting renewal, Central Ground Water Authority or State/ Ut Authority shall satisfy itself that the conditions of No Objection Certificate have been complied with.

iv. In case of change in category of the assessment unit, renewals would be granted with conditions as laid down for new category.

v. No Objection Certificate will be renewed for the terms specified for various uses as follows:

Category	Use	Term of renewal
Critical, Semi-critical and safe	Infrastructure projects for drinking & domestic use and urban Water Supply Agencies	5 years
	Industries	3 years
	Mines	2 years
Over exploited	All users in 'Over-exploited areas'	2 years

vi. If the application for renewal is submitted in time and the CGWA/ the respective State/ Ut Authority is unable to process the application in time, No Objection Certificate shall be deemed to be extended till the date of renewal of No Objection Certificate.

vii. If the proponent fails to apply for renewal within 3 months from the date of expiry of No Objection Certificate, the proponent shall be liable to pay Environmental Compensation for the period starting from the date of expiry of No Objection Certificate till No Objection Certificate is renewed by the competent authority.

12.0 Extension of No Objection Certificate

If the proponent is unable to construct the well(s) during the validity period of No Objection Certificate for genuine reasons, the proponent will have to apply for extension of No Objection Certificate. Application for extension should be supported by documents justifying the reasons for delay. Other conditions for grant of extension of No Objection Certificate will be the same as that for fresh No Objection Certificate.

Extension of No Objection Certificate will be granted for a maximum period of two years. No further extension will be granted after the expiry of the extended period. In that case, the applicant will have to apply afresh for grant of No Objection Certificate.

13.0 Delegation of powers against illegal groundwater withdrawal

Central Ground Water Authority has appointed the District Magistrate/ District Collector/ Sub Divisional Magistrates of each Revenue District/Sub division as Authorized Officers, who have been delegated the power to seal illegal wells, disconnect electricity supply to the energised well, launch prosecution against offenders etc. including grievance redressal related to ground water in their respective jurisdictions.

In order to further decentralise and strengthen the monitoring and compliance mechanism as per the guidelines, officials of concerned Departments of Revenue and Industries of the States/Uts shall be appointed as Authorised Officers in consultation with the State/Ut Governments.

A copy of the No Objection Certificate issued by the CGWA in the No Objection Certificate Application Portal (NOCAP) will be forwarded to the respective District Magistrate/ District Collector. In case of any violation of the directions of Central Ground Water Authority and non-fulfilment of the conditions laid

down in the No Objection Certificate, the Authorised Officers will file appropriate Petition/Original Application etc under sections 15 to 21 of the Environment (Protection) Act, 1986 in appropriate Courts.

14.0 Ground Water Level Monitoring

All the project proponents (drawing ground water more than 10 cum/d) have to mandatorily construct Piezometers (observation wells) within their premises for monitoring of the ground water levels. Such a mechanism of compliance conditions has been made to ensure that every month the ground water level in the project area can be monitored and observed. In this regard the necessary criteria for monitoring of water levels through piezometers by the project proponents is given in Table 14.1.

Table 14.1 No. of Piezometers to be constructed & Type of Water Level Monitoring Mechanism

S.No.	Quantum of Ground water withdrawal (cum/d)	No. of piezometer required	Monitoring mechanism		
			Manual	DWLR	DWLR with Telemetry
1	<10	0	0	0	0
2	11-50	1	1	0	0
3	51-500	1	0	1	0
4	>500	2	0	1	1

The piezometer shall be suitably located to ensure that zone of aquifer tapped in the piezometer is the same as that of the pumping well.

15.0 Environmental Compensation

Extraction of ground water for commercial use by industries, infrastructure units and mining projects without a valid No Objection Certificate from appropriate authority shall be considered illegal and such entities shall be liable to pay Environmental Compensation for the quantum of ground water so extracted. The norms prescribed by Central Pollution Control Board (CPCB) shall be utilized for calculating the Environmental compensation as mentioned below:

EC_{GW} = Ground water consumption per day x Environmental Compensation rate (ECR_{GW}) x No. of days x Deterrence factor

where ground water consumption is in m3/day and ECR_{GW} in Rs./ cum

15.1 Rates of Environmental Compensation:

Rates of Environmental Compensation (ECR_{GW}) for various types of users in different categories of assessment units are given in Table 15.1 to 15.3.

Table 15.1 : ECR_{GW} for Packaged Drinking Water units

S.No.	Area Category	Water Consumption (cum/day)			
		<200/	200 to <1000	1000 to <5000	5000 & above
		Environmental Compensation Rate (ECR_{GW}) in Rs./m3			
	Safe	12	18	24	30
2	Semi critical	24	36	48	60
3	Critical	36	48	66	90
4	Over- exploited	48	72	96	120
Note :-Minimum EC_{GW} shall not be less than Rs 1,00,000/-					

Table 15.2: ECR_{GW} for Mining/ infrastructure dewatering projects

S.No.	Area Category	Water Consumption (cum/day)			
		<200	200 to <1000	1000 to <5000	5000 & above
		Environmental Compensation Rate (ECR_{GW}) in Rs./m3			
1	Safe	15	21	30	40
2	Semi critical	30	45	60	75
3	Critical	45	60	85	115
4	Over- exploited	60	90	120	150
Note :-Minimum EC_{Gw} shall not be less thanRs 1,00,000/-					

Table 15.3: ECR_{GW} for Industrial units

S.No.	Area Category	Water Consumption (cum/day)			
		<200	200 to <1000	1000 to <5000	5000 & above
		Environmental Compensation Rate (ECR_{GW}) in Rs./m3			
1	Safe	20	30	40	50
2	Semi critical	40	60	80	100
3	Critical	60	80	110	150
4	Over- exploited	80	120	160	200
Note :-Minimum EC_{Gw} shall not be less thanRs 1,00,000/-					

15.2 Deterrent Factors to compensate losses and environmental damage (for packaged drinking water units, mining, industries and infrastructural dewatering projects)

The following deterrent factors based on the duration of illegal ground water extraction shall be levied to compensate for the losses and environmental damages as detailed in Table 15.4.

Table 15.4: Deterrent factor based on quantum of ground water withdrawal and number of years of illegal withdrawal

S.No.	Water Consumption	Deterrence Factor		
		< 2 years	2-5 years	>5 years
1	<1000 KLD	1.00	1.00	1.25
2	1000-5000 KLD	1.00	1.00	1.50
3	>5000 KLD	1.00	1.25	2.00

Note: KLD – Kilolitre per day

16.0 Provision of Penalty

Penalty shall be imposed on the proponents for non-compliance of No Objection Certificate conditions issued by the appropriate authority. Rates of penalty proposed for non-compliance of various conditions of No Objection Certificate are given in Table 16.1.The rates of the penalty shall be reviewed periodically with the approval of competent authority in Ministry of Jal Shakti.

Table 16.1: Penalty provision for non Compliance of No Objection Certificate conditions

S. No.	**Items**	Charges in Rs.
1	Non installation/faulty Digital water Flow meter with telemetry system.	200000
2	Non disclosure/ construction of additional groundwater abstraction structures a) Non-functional Structures. b) Defunct/Abandoned Note: Given rates are for unit non-functional/defunct/abandoned structures. This shall be multiplied with total such structures to arrive at consolidated penalty.	 200000 100000
3	Reporting of fresh water zones as Brackish / Saline zones in application.	200000
4	Non Installation of Piezometer.	200000
5	Non Installation/faulty DWLR/Telemetry system	100000
6	Non Construction/Inadequate capacity of Recharge / Water conservation structures.	500000
7	Non maintenance of Recharge structures.	200000
8	Injection of treated/untreated water into the aquifer system. Note: In addition to penalty, the proponent shall bear the cost of aquifer remediation as per the provisions of Environment (Protection) Act, 1986.	1000000
9	Non Submission of Water level/Water quality Data.	50000
10	Non-maintenance of log book of daily withdrawal/non submission of Groundwater abstraction data.	50000
11	Non submission of photograph of recharge structure(s).	50000
12	Non Submission of Self Compliance report.	100000
13	Construction of groundwater abstraction structures by un authorized/unregistered Drilling Rigs (per structures).	100000
14	Non registration of water supply tankers.	500000
15	Submission of false information/ undertaking.	100000

Charges shall also be payable for correction/modification in the existing issued No Objection Certificate letter. The details of such charges are given in Table 16.2.

Table 16.2: Proposed Charges for correction/Modification in the existing issued No Objection Certificate

S. No.	**Items**	Charges in Rs.
1	Change in recharge quantum	10000
2	Change in User ID.	5000
3	Change in firm Name	5000
4	Extension of No Objection Certificate	5000
5	Issuance of duplicate No Objection Certificate	5000
6	Issuance of corrigendum to No Objection Certificate	5000
7	Any other items/corrections etc	5000

17.0 Other important Conditions (Applicable to all):

i. Sale of ground water by a person/ agency not having valid no objection certificatefrom CGWA/State Ground Water Authority is not permitted.

ii. In infrastructure projects, paved/parking area must be covered with interlocking/perforated tiles or other suitable measures to ensure groundwater infiltration/harvesting.

iii. In case of Infrastructure projects, the firm/entity shall ensure implementation of dual water supply system in the projects. Compliance of the same shall be submitted through the web portal.

iv. Non-compliance of conditions mentioned in the No Objection Certificate may be taken as sufficient reason for cancellation of no objection certificate accorded/ non-renewal of No Objection Certificate.

v. No application shall be entertained without supporting documents as specified in relevant sections.

vi. Abstraction structure(s) should be located inside the premises of project property.

vii. Self compliance of conditions laid down in the no objection certificate shall be reported by the users online in the web portal of Central Ground Water Authority/state Ground Water Authority.

viii. Processing fee prescribed, if any, from time to time shall be charged for various services.

Note:

1. Guidelines are subject to modification from time to time.

2. In case of any discrepancy between Hindi and English versions of this document including the annexures, the English version shall prevail.

Annexure I

Estimation of Water Requirements for drinking and domestic use

(Source: National Building Code 2016, BIS)

a) Residential Buildings:

Accommodations	Population
1 Bedroom dwelling unit	4
2 Bedroom dwelling unit	5
3 Bedroom dwelling unit	6
4 Bedroom dwelling unit and above	7

Notes:

1) The above figures consider a domestic household including support personnel, wherever applicable.

2) For plotted development, the population may be arrived at after due consideration of the expected number and type of domestic household units.

3) Dwelling unit under EWS category shall have population requirement of 4 and studio apartment shall have population requirement of 2.

As a general rule the following rates per capita per day may be considered for domestic and non-domestic needs:

a) For communities with populations up to 20,000:

1)	Water supply through stand post:	40 lphd (Min)
2)	Water supply through house service: connection	70 to 100 lphd

b) For communities with: 100 to 135 lphd
population 20,000 to 100,00 together with
full flushing system

c) For communities with population: 150 to 200 lphd
above 100,000 together with
full flushing system

Note—The value of water supply given as 150 to 200 litre per head per day may be reduced to 135 litre per head per day for houses for Medium Income Group (MIG) and Low Income Groups (LIG) and Economically Weaker Section of Society (EWS), depending upon prevailing conditions and availability of water.

Out of the 150 to 200 litre per head per day, 45 litre per head per day may be taken for flushing requirements and the remaining quantity for other domestic purposes.

A. **Water Requirements for Buildings Other than Residences**

Sl No.	Type of Building	Domestic litres per head/ day	Flushing Litres per head/ day	Total Consumption Litres per head/ day
1.	Factories including canteen where bath rooms are required to be provided	30	15	45
2.	Factories including canteen where no bath rooms are required to be provided	20	10	30
3.	Hospital (excluding laundry and kitchen): a) Number of beds not exceeding 100	230	110	340
	b) Number of beds exceeding 100	300	150	450
	c) Out Patient Department (OPD)	10	5	15
4.	Nurses' homes and medical quarters	90	45	135
5.	Hostels	90	45	135
6.	Hotels (up to 3 star) excluding laundry, kitchen, staff and water bodies	120	60	180
7.	Hotels (4 star and above) excluding laundry, kitchen, staff and water bodies	260	60	320
8.	Offices (including canteen)	25	20	45
9.	Restaurants and food court including water requirement for kitchen: a) Restaurants	55 per seat	15 per seat	70 per seat
	b) Food Court	25 per seat	10 per seat	35 per seat
10.	Clubhouse	25	20	45
11.	Stadiums	4	6	10

12.	Cinemas, concert halls and theatres and multiplex	5 per seat	10 per seat	15 per seat
13.	Schools/Educational institutions: a) Without boarding facilities b) With boarding facilities	25	20	45
		90	45	135
14.	Shopping and retail (mall) a) Staff	25	20	45
	b) Visitors	5	10	15
15.	Traffic Terminal stations a) Airports	40	30	70
	b) Railway stations (Junction) with bathing facility	40	30	70
	c) Railway stations (Junction) without bathing facility	30	15	45
	d) Railway stations (Intermediate) with bathing facility	25	20	45
	e) Railway stations (Intermediate) without bathing facility	15	10	25
	f) Interstate bus terminals	25	20	45
	g) Intrastate Bus Terminals/Metro Stations	10	5	15

Notes:

1. For calculating water demand for visitors, consumption of 15 litre per head per day may be taken.

2. The water demand includes requirement of patients, attendants, visitors and staff. Additional water demand for kitchen, laundry and clinical water shall be computed as per actual requirements.

3. The number of persons shall be determined by average number of passengers handled by stations, with due considerations given to the staff and vendors who are using these facilities.

4. Consideration should be given for seasonal average peak requirements.

5. The hospitals may be categorized as Category A (25 to 50 beds), Category B(51 to 100 beds), Category C (101 to 300 beds), Category D (301 to 500) and Category E (501 to 750 beds).

Annexure II

Guidelines for construction of Piezometers and monitoring of Ground Water Levels and Quality

Piezometer is a borewell/tubewell used only for measuring the water level by lowering a tape/sounder or automatic / digital water level measuring equipment. It is also used to take water sample for water quality testing whenever needed. General guidelines for installation of piezometers are as follows:

- The piezometer is to be installed/constructed at the minimum distance of 50 m from the pumping well through which ground water is being withdrawn. The diameter of the piezometer should be about four inches to six inches.

- The depth of the piezometer should be the same as that of the pumping well from which ground water is being abstracted. If, more than one pumping wells are constructed tapping aquifers at different depths, more than one piezometers shall be required to be constructed tapping different aquifers as in the pumping wells.

- The measurement of water level in piezometer should be taken, only after the pumping from the surrounding tubewells has been stopped for about four to six hours.

- The ground water quality has to be monitored once in a year during pre-monsoon (April/ May) period by industries and mines drawing ground water. Samples of ground water should be analyzed from NABL accredited laboratory.

- A permanent display board should be installed at Piezometer/ Tubewell site for providing the location, piezometer/ tubewell number, depth and zone tapped of piezometer/tubewell for standard referencing and identification.

- Any other site specific requirement regarding safety and access for measurement may be taken care off.

Annexure III

Measures to be adopted to ensure prevention from pollution in the plant premises of polluting industries/ projects

It has been observed that ground water in and around polluting industries like Tannery, Slaughter Houses, Dye, Chemical, Coalwashery, other hazardous units, etc., is polluted. In order to prevent further deterioration of ground water quality, it is essential to take all necessary measures for well head protection. All industries/ projects falling under this category are hereby directed to follow the under mentioned procedure both for existing and new category.

1. No tube well/ bore well / dug well should be constructed in the vicinity of the processing unit. Tube well/ bore well should be constructed at the place which is hygienically maintained.

2. Only Mild Steel pipe should be used for assembly/ casing and PVC (Poly Vinyl Chloride) or similar pipes should not be used. The tube well/ bore well having PVC or similar pipes should be abandoned and filled back.

3. Around the tube well/ bore well, RCC (Reinforced Concrete Cement) grouting of 3 meters (length) x 3 meters (width) x 2 meters (depth) must be provided. The pipe of the tube well/ bore well must be raised 1 meter above ground level (1 magl). The tube well/ bore well must be surrounded by RCC wall of 0.5 meter height and 1.5 meter depth to prevent any surface contamination to enter the constructed tube well/ bore well. Plan/Sectional diagram is enclosed for reference (Appendix 1 and 2).

3. The tube well/ bore well must be fitted with NRV (Non Return Valve) in order to ensure that the constructed tube well/ bore well is exclusively used for abstraction of ground water only.

4. At no point of time there should be any injection of any water or fluid into the constructed tube well/ bore well/ Piezometer.

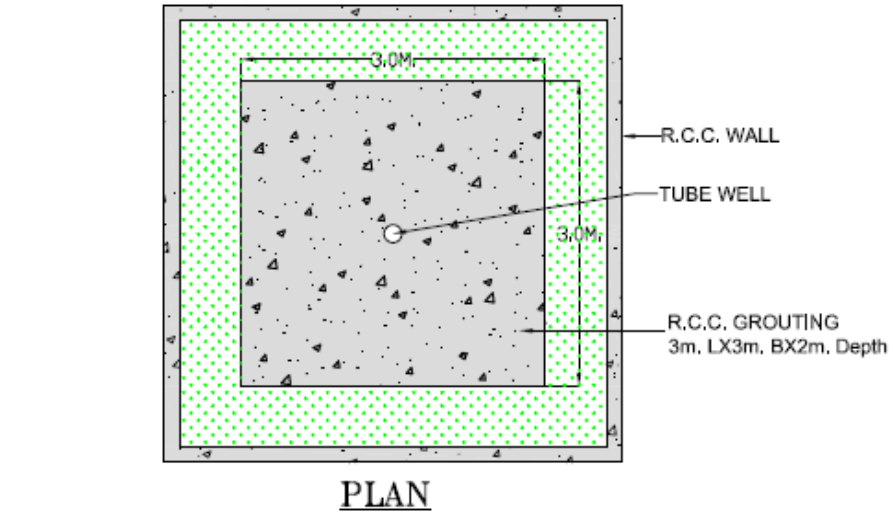
5. The industries/ projects under this category should not implement any recharge measures within the plant premises.

6. Any tube well/ bore well located/ constructed in the vicinity of STP (Sewage Treatment Plant) or ETP (Effluent Treatment Plant) should be abandoned and filled back.

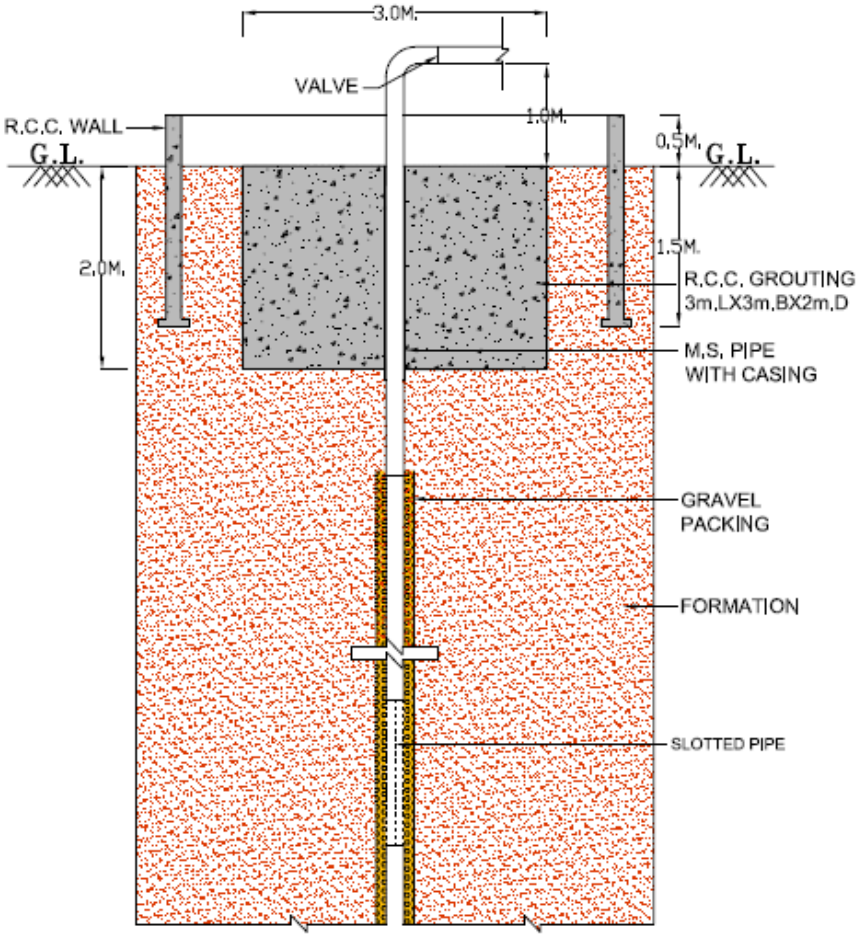
7. The piezometer to be constructed for monitoring purpose should follow the same procedure as that for tube well/ bore well for such industries/ projects.

Appendix 1

Plan/ Sectional diagram showing well head protection



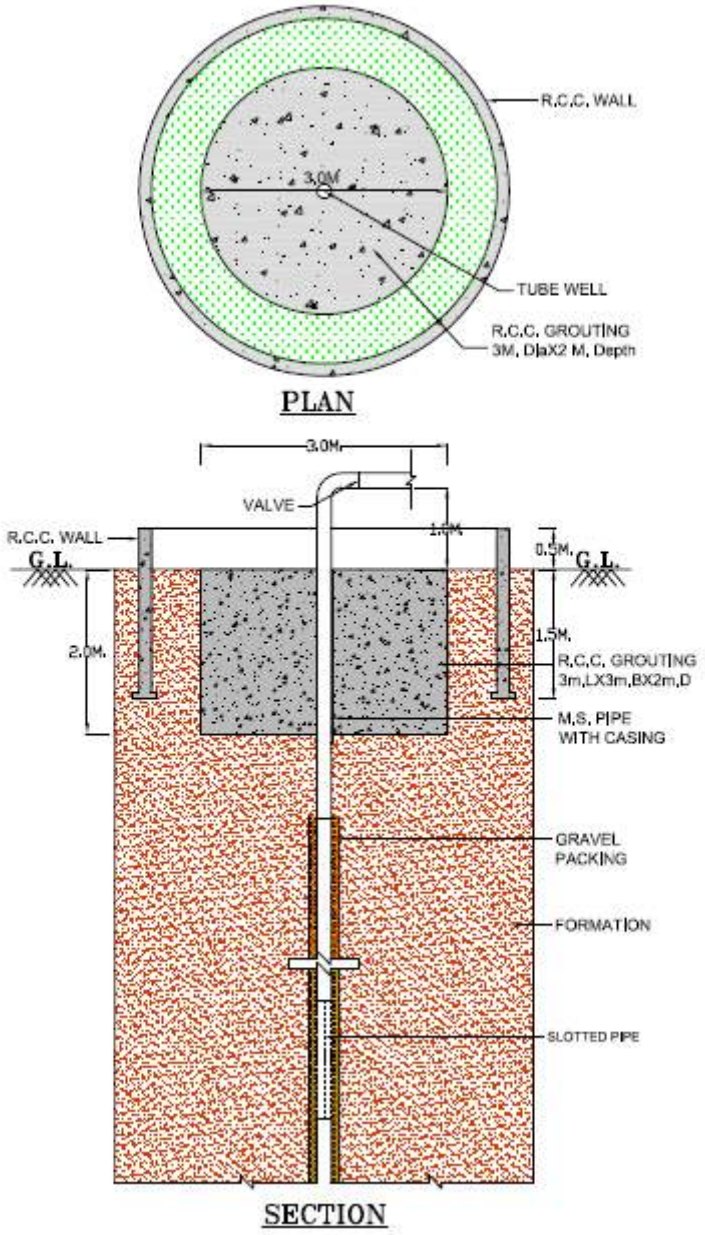
PLAN



SECTION

Appendix 2

Plan/ Sectional diagram showing well head protection



Annexure-IV

Outline of hydro-geological Report for obtaining No Objection Certificate for industries

1. Brief about the proposed project giving location details, coordinates, google/ toposheet maps, etc. demarcating the project area.

2. Ground water situation in and around the project area including water level and quality data and maps along with quality issues, if any. In case of mines, ground water conditions in both core and buffer zone should be described.

3. Details of the tubewells/ borewells proposed to be constructed. This includes the drilling depth, diameter, tentative lithological log, details of pump to be lowered, H.P. of pump, tentative discharge of tubewells/ borewells, etc. Locations to be marked on the site plan/ map. Location of proposed piezometers.

4. Details of Geophysical studies carried out in and around the project area. Ground water resources computation of the block in which the project falls.

5. Approved Mine plan in case of mines and detailed dewatering plan in case of mine/ infrastructure dewatering projects.

6. Proposed usage of pumped water in case of mining/ infrastructure dewatering projects.

7. Comprehensive assessment of the impact on the ground water regime in and around the project area highlighting the risks and proposed management strategies proposed to overcome any significant environmental issues.

8. Proposed measures for disposal of waste water by industries drawing saline water.

9. Measures to be adopted for water conservation which include recycling, reuse, treatment, etc. This includes the water balance chart being adopted by the firm along with details of water conservation methods to be adopted.

- Brief write up along with capacity and flow chart of Sewage Treatment Plants / Effluent Treatment Plants / Combined Effluent Treatment Plants existing/ proposed within the project.
- Details of water conservation measures to be adopted to reduce/ save the ground water.
- Total water balance chart showing the usage of water for various processes.

10. Any other details pertaining to the project.

Annexure V

Format of the Report on ground water conditions (for mining projects)

Introduction

Project description

Background

Objectives and scope

Regional setting

Location

Landuse

Climate

Topography and drainage

Geology –Regional and Local

General Hydrogeology (aquifer types, aquifer depth, zone tapped etc.)

Groundwater condition (In core and buffer zones)

Spatial and temporal variations in water levels Groundwater quality (Shallow and deep aquifer)

Impact of groundwater extraction on local groundwater

Hydrograph of water level/piezometer in monitoring wells

Trend analysis of historical water levels Flow net analysis (groundwater flow direction)

Year wise/ bench wise mine dewatering computation as per approved mine plan

Conclusions

Annexure VI

Indicative list of Infrastructure projects

Residential townships including commercial buildings
Office building
School
College
University
Special Economic Zone
Metro Station
Railway Station
Bus Depot
Airport
Seaport
Highway infrastructure
Fire station
Warehouse
Business Plaza
Malls & Multiplex
Hospitals
Nursing Homes
Resort
Hotel/ Restaurant/ Food Plaza
Holiday home/Guest house/ Hostels
Banquet Hall/ Marriage Gardens
IT Complex
Logistics & Cargo
Clubs
Trade Centre

Annexure -VII

Supreme Court Order in Civil Writ petition 36 of 2009 regarding measures for prevention of fatal accidents of small children due to their falling into abandoned bore wells and tube wells

In Re: Measures for prevention of fatal accidents of small children due to their falling into abandoned bore wells and tube wells

Union of India and Ors. Respondents(s)

ORDER

With this Court issuing requisite guidelines vide order dated 11th February, 2010, subject to slight modifications, nothing survives in the present writ petition.

That modification is as follows:

(i) The owner of the land/ premises, before taking any steps for constructing bore well/ tube well must inform in writing to the concerned authorities in the area, i.e., District Collector/ District Magistrate/ Sarpanch of the Gram Panchayat/ any other Statutory Authority/ concerned officers of the Department of Ground Water/ Public Health/ Municipal Corporation, as the case may be, about the construction of bore well/ tube well.

(ii) Registration of all the drilling agencies, namely, Government/ Semi Government, Private etc. should be mandatory with the district administration/ Statutory Authority wherever applicable.

(iii) Erection of signboard at the time of construction near the well with the following details:-

(a) Complete address of the drilling agency at the time of construction/ rehabilitation of well.

(b) Complete address of the user agency/owner of the well.

(iv) Erection of barbed wire fencing or any other suitable barrier around the well during construction.

(v) Construction of cement/ concrete platform measuring 0.50x0.50x0.60 meter (0.30 meter above ground level and 0.30 meter below ground level) around the well casing.

(vi) Capping of well assembly by welding steel plate or by providing a strong cap to be fixed to the casing pipe with bolts & nuts.

(vii) In case of pump repair, the tube well should not be left uncovered.

(viii) Filling of mud pits and channels after completion of works.

(ix) Filling up abandoned bore wells by clay/sand/boulders/pebbles/drill cuttings etc. from bottom to ground level.

(x) On completion of the drilling operations at a particular location, the ground conditions are to be restored as before the start of drilling.

(xi) District Collector should be empowered to verify that the above guidelines are being followed and proper monitoring check about the status of bore holes/ tube wells are being taken care through the concerned state/ Central Government agencies.

(xii) District/ Block/ Village wise status of bore wells/tube wells drilled viz. No. of wells in use, No. of abandoned bore wells/ tube wells found open, No. of abandoned bore wells/ tube wells properly filled up to ground level and balance number of abandoned bore wells/ tube wells to be filled up to ground level is to be maintained at District Level.

In rural areas, the monitoring of the above is to be done through Village Sarpanch and the Executive from the Agriculture Department.

In case of urban areas, the monitoring of the above is to be done through Junior Engineer and the Executive from the concerned Department of Ground Water/Public Health/ Municipal Corporation etc.

(xiii) If a bore well/ tube well is 'Abandoned' at any stage, a certificate from the concerned department of Ground Water/ Public Health/ Municipal Corporation/ Private Contractor etc. must be obtained by the aforesaid agencies that the 'Abandoned' bore well/tube well is properly filled upto the ground level. Random inspection of the abandoned wells is also to be done by the Executive of the concerned agency/ department. Information on all such data on the above are to b maintained in the District Collector/ Block Development Office of the State.

We are informed that the last paragraph of the earlier order dated 11th February, 2010, concerning publicity has been duly complied with.

Subject to the above, the writ petition is disposed of.

……..CJI.
[S.H. KAPADIA]

……..….J.
[K.S. RADHAKRISHNANA]

…….……J.
[SWATANTER KUMAR]

New Delhi,
August 6, 2010

ANNEXURE VIII

List of States/Union territories where ground water extraction is being regulated by Central Ground Water Authority

1. Andaman and Nicobar Islands
2. Assam
3. Arunachal Pradesh
4. Bihar
5. Chhattisgarh
6. Dadra and Nagar Haveli and Daman and Diu
7. Gujarat
8. Haryana
9. Jharkhand
10. Madhya Pradesh
11. Maharashtra
12. Manipur
13. Meghalaya
14. Mizoram
15. Nagaland
16. Odisha
17. Punjab
18. Rajasthan
19. Sikkim
20. Tripura
21. Uttar Pradesh
22. Uttarakhand
23. Andhra Pradesh (only mining projects)
24. Telangana (only mining projects)

Annexure IX

Glossary of technical terms used

1. **Safe area**: Area categorized as SAFE from the ground water resources point of view, based on the latest ground water resources assessment carried out jointly by CGWB and State ground water organizations. Details available on the websites of NOCAP and CGWB.
2. **Semi-critical area**: Area categorized as SEMI-CRITICAL from the ground water resources point of view, based on the latest ground water resources assessment carried out jointly by CGWB and State ground water organizations. Details available on the websites of NOCAP and CGWB.
3. **Critical area**: Area categorized as CRITICAL from the ground water resources point of view, based on the latest ground water resources assessment carried out jointly by CGWB and State ground water organisations. Details available on the websites of NOCAP and CGWB.
4. **Over-exploited area**: Area categorized as OVER-EXPLOITED from the ground water resources point of view, based on the latest ground water resources assessment carried out jointly by CGWB and State ground water organisations. Details available on the websites of NOCAP and CGWB.
5. **Aquifer**: Geological formation capable of storing and transmitting ground water.
6. **Deeper Aquifer**: In areas having multiple aquifer system, the aquifer(s) occurring below the uppermost aquifer.
7. **Well**: Any structure used for the extraction of groundwater, including open wells, dug wells, bore wells, dug-cum-bore wells, tube wells, filter points, collector wells, infiltration galleries, recharge wells, or any of their combinations or variations.
8. **Government Agency**: May be Central or State Government body.
9. **Supplier**: Government/ Government approved Water Supply Agency.
10. **Mine**: Area where mining activity is taking place, or area abandoned after mining.
11. **Illegal Ground Water abstraction Structure**: Any energized abstraction structure viz. dugwell, tubewell, borewell which is being used to withdraw ground water without valid No Objection Certificate from Central Ground Water Authority.
12. **Rainwater Harvesting**: The technique or system of collection and storage of rainwater, at micro watershed scale, including roof-top harvesting, for future use or for recharge of groundwater.
13. **Mining Project**: Project which involves mining activity either open cast or underground or both.
14. **Ground Water Draft**: Quantum of ground water withdrawal.
15. **Saline Water**: Water having salinity in excess of 2500 μsiemens/cm at 25^0C.
16. **Water Table Intersection**: Intersection of the water table on excavation of the overlying material due to mining or other activities.
17. **Drinking and domestic use**: Besides drinking & domestic use of households, this category will cover drinking requirement of industries not requiring water for industrial process; drinking, washing, cleaning use etc. in case of hospitals, hotels, malls & multiplexes, institutions, offices, banquet halls, fire stations, metro stations, railway stations, airports, sea ports, stadia etc.
18. **Recycle/Reuse**: Using treated waste water for various purposes/ putting water to multiple uses.
19. **Government Department:** Either Central Government or State Government.
20. **Municipality:** Municipality, a Municipal Corporation or similar body of local urban governance by any other name.
21. **Groundwater:** Water, which exists below the surface in the zone of saturation and can be extracted through wells or any other means or emerges as springs and base flows in streams and rivers;
22. **Bgl :** Below Ground Level.
23. **BCM :** Billion cubic metres.

24. **Groundwater Abstraction structure:** Structure used to withdraw groundwater like bore well / tube well / dug well/dug cum bore well/tunnel well.

25. **Observation well or Piezometer:** A bore well/tube well used only for measuring the water level/piezometric head and to take water sample periodically but not used for groundwater abstraction.

26. **Water Audit:** A method of quantifying water use in simple or complex systems, with a view to reducing water usage and often saving money on otherwise unnecessary water use.

27. **Ground water pollution:** If concentration of any parameter in ground water exceeds the maximum permissible limit for drinking water prescribed by the Bureau of Indian Standards.

28. **Cooperative Group Housing Societies/ Builder flats**: A Housing Society is a society formed by house owners within a residential complex. The housing society formed must be formally registered with registrar of co-operatives.

29. **KLD –** Kilo Litre per day

30. $\mathbf{EC_{GW}}$ - Environmental compensation for drawing illegal ground water.

31. $\mathbf{EC_{GWR}}$ - Environmental compensation rates for drawing illegal ground water.

ANNEXURE X

Annual water audits by the industries (Source – CII)

Water audit is a systematic process of objectively obtaining a water balance by measuring flow of water from the site of water withdrawal or treatment, through the distribution system, and into areas where it is used and finally discharged. Conducting a water audit involves calculating water balance, water use and identifying ways for saving water.

Water audit involves preliminary water survey and detailed water audit. Preliminary water survey is conducted to collect background information regarding plant activities, water consumption and water discharge pattern and water billing, rates and water cess. After the analysis of the secondary data collected from the industry, detailed water audit is conducted, which involves the following steps:

- On site training and discussion with facility manager and personnel
- Water system analysis
- Quantification of baseline water map
- Monitoring and measurements using pressure and flow meters and various other devices
- Quantification of inefficiencies and leaks
- Quantification of water quality loads and discharges
- Quantification of variability in flows and quality parameters
- Strategies for water treatment and reuse or direct use

A detailed water balance is finally developed. Water quality requirement at various user areas is mapped, which helps in developing ‘recycle’ and ‘reuse’ opportunities.

The detailed water audit report contains the following:

- Water consumption and wastewater generation pattern
- Specific water use and conservation
- Complete water balance of the facility
- Water saving opportunities
- Method of implementing the proposals
- Full description and figures
- Investment required

Industries can undertake following measures for water conservation:

- Setting up of norms for water budgeting
- Modernization of industrial process to reduce water consumption
- Recycling water with a re-circulating cooling system
- Ozonation cooling water approach which can result in five fold reduction in blow down when compared to traditional chemical treatment
- Reduction in reuse of de-ionized water by eliminating some plenum flushes, converting from a continuous flow to an intermittent flow system and improving control on the use
- Use of waste water for gardening
- Proper processing of effluents to adhere to the norms of disposal.

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ANNEXURE R9

Assessment of water resource consumption in building construction in India

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Abstract

Building construction is a highly resource intensive process, concerning use of materials, land, energy and water. Since buildings are required to fulfil our primary need for shelter, consumption of these resources is simply unavoidable. However, with shrinking stock of natural resources and degrading eco-system services, the consumption process has to be wise, judicious and non-wasteful. Search for alternative and recycled materials, multiple floor spaces and use of renewable energy are some of the human responses against the perceived threat of materials, land and energy constraints respectively. Water resource management in building construction and operation, however, has still a long way to go, especially because the amount of water used per unit area of construction largely remains undocumented. There has been some pioneering research on embodied water measurement of several non-residential buildings in Australia. In this backdrop, the present paper seeks to understand and assess the quantity of fresh water used in contemporary urban multi-storeyed residential buildings and reports a study conducted for a real-life project in Calcutta (now, Kolkata), India. Since the use of construction water directly varies with the type of construction, a steel and glass building will have its embodied water-footprint mainly on account of that of its materials while on-site water use plays a major role in case of a cast-in-situ reinforced cement concrete and brick building. Thus, water efficiency at the production stage is required in the first case while the second category demands concerns and actions at the consumption stage. This paper examines some of the issues related to the subject like water demand at material production as well as construction stage and the resultant embodied water of typical urban constructions in India, which was found to be in the range of about 27 Kilolitres/Sq m of total built-up area.
Keywords: construction water, ground water, site water management.


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1 Introduction

Fresh Water is a very precious natural resource and it is widely reported that the world reserve of fresh water is fast depleting. Life on earth is not possible without water. Climate change concerns across the globe has predicted severe water scarcity due to degrading eco-system services and World Business Council for Sustainable development (WBCSD) in its Vision 2050 statement has estimated an additional load of more than 500 million people under water-stress conditions in the BRIC (Brazil-Russia-India-China) countries by 2030 [1]. In India, with the National Action Plan for Climate Change (NAPCC) and its constituent National Water Mission, a target of 20% increase in water-use efficiency has been set to counter the challenge [2]. The National Water Policy of Government of India recognizes the need of planning the economic activities like agriculture, industries and urban development in conformity with availability of this life-sustaining resource and has recommended water-zoning [3]. From the point of view of urban development, building industry is known to be a major consumer of water resource, which in many cases, is the ground water extracted through bore-wells. There also had been reports of major subsidence threats due to over-exploitation of this important reserve in a particular segment of the city of Calcutta (now, Kolkata), India.

In a building's entire life-cycle, water and energy are considered to be the two major pillars that support human activities in it. While there are many studies on embodied energy and recurring energy consumption in buildings, such database appears scanty in the field of water. Similarly, embodied energy of building constituent materials is also available along-with their embodied CO_2 emission factor, which is again not the case when water resource is concerned. Even industry related documents, in most cases, barely touches upon water use in their raw materials' inventory. Thus, there seems to be a big void when similar baseline research data availability with respect to water is looked for. Out of one of the few studies, United Nations Environment Program [4] has indicated that over an entire life-cycle, the building industry consumes a global average of 30% of fresh water and generates 30% of world's effluents. In India, the manual on water supply and treatment [5] has indicated water consumed per unit production of steel and it is, thus, one of the few building materials having a recorded water foot-print. Other major building materials like bricks, cement, aluminium, glass etc. use considerable quantity of water in their manufacturing process through extraction and processing, though data on their water-foot print is not readily available. In this backdrop, the present paper seeks answers to the following research questions:

- Is it possible to know the capital water content or water foot-print of a building in India? This is precisely its embodied water.
- To know the above, it will also be important to know the water foot-print or embodied water of its constituent materials, at least the common ones. Is there any such data or reported research finding for Indian products in this area?

- It will also be important to understand the amount of water used during the actual construction process, both direct and indirect. How can this construction water be estimated for Indian buildings?

The above key issues have been deliberated in the course of the paper to the extent possible on the basis of available data, documentation and an actual case study.

2 Research so far

Internationally, one particular research team has been known to have done extensive research in this field. Researchers in Australia [6, 7] and their studies suggest that embodied water is many times greater than the volume of water used during a building's life. The team working at Deakin University, Victoria, looked at 17 non-residential case studies in Australia and found that embodied water could be as much as 20 kilolitres per m^2 of gross floor area, but that water required during the construction process was minimal. The buildings studied include examples from the health, education and commercial sectors; and the team looked at the embodied water of the structure, substructure, finishes, roof and services. The UK concrete industry [8] has agreed on a 'Concrete Industry Sustainable Construction Strategy' and has reported that "*though no studies have been done on homes in the UK, a 2004 study in Australia estimated that a typical Australian house represents about 15 years worth of operational water i.e. water used for cooking, cleaning, washing, drinking, toilet flushing and gardening. This study estimated that a kilo of concrete has about two litres of embedded water, a kilo of timber about 20 litres, a kilogram of steel about 40 litres, a kilo of aluminium about 88 litres, and that a kilogram of plastic has about 185 litres of embedded water.*" This reporting shows that there has been sufficient work in finding out the embodied water in building materials and structures in Australia, though no such research has been reported from India. In contrary, operational water use has been under recent focus by one of the leading national organizations. Centre for Science and Environment, New Delhi, India [9] has taken up a study for developing water efficiency labeling and standards in Indian conditions. This study is aimed at rating fixtures like dual flush toilets, low water using/ sensor based/waterless urinals, sensor faucets/faucets with flow restrictors, water efficient showers etc. according to their efficiency, much like what has already been done for electrical appliances. However, studies on embodied water content of buildings being relatively complex involving multi-stage activities – raw material extraction, manufacture and construction – have not yet been conclusively reported by either industry or academic groups. It may be presumed that even if research is on-going in this area, results from more than one source will only substantiate the findings and will help to draw closer to accuracy by collating the output data.

3 Significance in national context

Reducing water consumption and improving water efficiency in buildings is a major step towards sustainable water management [8]. Unless the embodied water content of a building is known or measured, water management is not possible. Rampant misuse of water will continue and the objectives of National Water Policy of better water management practices and improvement in operational technology will remain unfulfilled. Further, this is integrally linked with sustainable building concepts and sustainable development issues. Life Cycle Analysis (LCA) of buildings and its corresponding eco-profile is considered to be a rational method of quantifying the 'environmental impact' or 'greenness' of a building [10]. However, this is dependent on real-life resource consumption amounts and other relevant data that are at present not available or are difficult to ascertain because of lack of base-line research in this area. Hence, LCA of buildings are currently carried out with assumed figures and therefore, seldom give the true picture. The present study intends to contribute in filling up these research gaps. With water shortages likely to grow in significance around the world due to climate change and Indian construction industry growing at an astounding rate of 10% per annum over the last ten years [11], this is an issue that needs immediate attention. The indigenous green building rating system titled Green rating for Integrated Habitat Assessment (GRIHA) has stipulated points for buildings which are resource efficient. The results of this study can be integrated into the ratings to determine a measurable and objective way of assessing their sustainability. This will give greater credence to the rating system and its scientific basis. It is expected that the architect community, real estate industry and general public will be more conscious and judicious in future water-use. Studies on multiple live case studies can create baseline data to help in framing appropriate policies for achieving water use reduction. This will support the goals of sustainable development, National Water Policy and National Water Mission under NAPCC.

4 Embodied water assessment in buildings

A group of multi-storied residential apartment building of steel and RC construction located in the southern part of the city of Calcutta in the Eastern Indian state of West Bengal was selected for studying its embodied water content. This project is a prototype of the developmental activities taking place in the housing sector in the entire country. It is meant for people belonging to high income group and is also designed for luxurious life-style. Thus, the choice of materials and the quality of construction are both superior. Understandably, for the type of construction mentioned above, steel and cement form the two most volumetrically significant as well as water-intensive materials, the latter requiring water at both production and construction stage. The total built-up area of the apartments together exceeds three million square feet and was constructed between the years 2002 and 2008. The site had a total of six bore wells to supply water for construction of the said building group.

4.1 Methodology

The methodology presented here involves two stages- one that assesses the embodied water of the materials used in the building and the second assesses the amount of water used during the construction process. The project office of the building was approached to access the materials' purchase records and the assessment was carried out on the basis of the figures provided by them. However, it is important to note that a large amount of construction was made from Ready Mix Concrete, whose embodied water content needs specific study and has not been covered here. The major building materials having the highest stake in the constructed volume such as bricks, cement and steel were considered in the first stage of assessment as presented in table 1. The second stage had two optional methods- the first one involving theoretical calculation of the water requirement for concrete mixes and curing of brick masonry as well as concrete castings, while the other depends on data collection on water consumption directly from site sources to have an idea on the various indirect and otherwise unrecorded heads for which water is used during construction like watering for sub-grade stabilization, dust control, water line testing and cleaning, use by on-site resident construction labours, so on and so forth. Research on concrete mixes in Indian conditions have estimated a savings of 7,500,000 tonnes of cement as well as 3,750,000 Kilolitre of potable water by the use of water-reducers for concrete mixes with 50 million tonnes of cement, indicating 2 Kilolitres of water requirement per ton of cement used in concrete mixes [12]. To account for the indirect component of water usage, this paper follows the second line of investigation and presents the water consumption assessment during construction stage from data released by the project office on the electrical energy expended on account of water pump operation at site. These figures were converted to equivalent water quantity on the basis of known yield of the bore wells as presented in table 2. The outcome of both the stages is expressed in Kilolitres per Sq m (Kl/Sq m) i.e. water used per unit floor area of the constructed building. The total embodied water of the building will be given by the sum of these two amounts.

Table 1: Assessment of embodied water in the materials of the case study.

Sl.	Materials	Quantity used	Unit	EW Coefficient	Total Embodied water in material	Embodied water per unit floor area
				Kl/unit	Kl	Kl/Sq m
1	Cement	154,858	Ton	1	154,858	0.5
2	Bricks	42849.37	Cum	0.71	30423	0.1
3	Steel	38906	Ton	200-250	7781200	25
4	Aluminium	15143	Kg	0.088	1332.584	0.004
	Total embodied water of the major materials					25.604

Table 2: Water consumption for 68 months during construction.

A	B	C= A/B	D	DxC/1000
Energy consumed in 21 months	Capacity of Water Pumps	Duration of operation	Yield of bore well	Total water consumed
KWh	kW	Hours	Litres per Hour (lph)	Kl
972319.44	5.595 (7.5 H.P) &7.46 (10.0 H.P.)	24826.23	18,000 & 24,000	
	Average: 6.5275			
	For 6 pumps: 39.165 kW		21000	521350.83

4.2 Embodied water attributed by materials

As mentioned earlier, only the major stake holding materials have been considered in this study, especially as the embodied water in these materials in Indian scenario were found to be somewhat available. However, these figures either came in from more than a decade old documents or had to be calculated from mentions in studies and researches with different thrust areas. These are explained in the following text:

Cement: In an industrial documentation study of Central Pollution Control Board [13], different values were obtained on water consumption in cement industry. It was found to be varying between 0.5 Kl/ton to 1 Kl/ton. For the purpose of this study, 1 Kl/ton has been considered as embodied water foot-print of cement.

Steel: Manual on water supply and treatment [5] specifies water embodied in steel as 200-250 Kl/ton of steel manufacture. Although this is excessively high compared to that obtained in international studies, which is in the range of 40 Litres/Kg or 40 Kl/ton [8], this is the only authentic figure obtained in Indian context and, therefore, considered in this paper.

Brick: Brick manufacturing sector in India is largely informal and without much documentation on its water consumption per unit of production. A technical note of Brick Industries' Association [14] mentions water requirement as 20-30% of clay amount, which works out to be about 300 Litres/Cum of brick manufacture. Local practice, however, would certainly involve much more water, not only because of water abundance, but also owing to lesser awareness of water issues. Hence, this paper draws parallel between the consistency in concrete mix with that of brick and builds on the water-cement ratio of M20 concrete to arrive at the possible water quantity in brick manufacture [15]. This works out to be 714 Litres/Cum, more than double the previous figure. The total brick volume used in the building fabric was obtained from the number of bricks purchased by the Project.

Additionally, in the interest of research, a fourth material - Aluminium has also been included as its embodied water was available from International reports [8], though its contribution, as expected, is insignificant.

4.3 Water consumption during actual construction

The data of electrical expenses on account of on-site water pumping during construction period was available for some 68 months. This monetary value was converted into energy consumed in Kilo-Watt-Hour (kWh) by dividing it with the unit energy rate, considered here to be 3.91 INR as per available contemporary data and the energy consumed by the water pumps was calculated. Total energy equivalent for water resource use was found to be 972319.44 kWh for these 68 months. As mentioned earlier, the construction water was supplied by the six on-site bore wells. The capacities of on-site water-pumps, as obtained from site sources, were 7.5 H.P and 10.0 H.P. The quantity of water consumed during the process of construction was, thus, calculated based on the known discharge capacity or the yield of the pumps. This Water foot-print calculation for rest of the construction period i.e. 81 months was extrapolated from the results obtained. The running of water-pumps for approximately 12 hrs a day also validated the total number of pump operation hours obtained from this assessment.

Thus the water consumption for 68 months comes to around 521350.83 Kl for the building construction. Assuming uniform rate of pump operation throughout the construction period, the total Water Consumption (W_C) for the 81 months of construction works out to be 621020.84 Kl. The total built-up area of the building group being 310173.22 Sq m, embodied water (W_A) per unit area constructed is $W_A = W_C$ / Built-up area = 2 Kl/ Sq m. A previous study had estimated the construction water use of a three storied 1150 Sq m building of RC construction to be 1 Kl per Sq m [15] in the same region and therefore, the present finding appears reasonably acceptable.

4.4 Results and discussion

Inferring from the above calculations, the embodied water of the major building materials together worked out to be 25.604 Kl/Sq m while the water consumed during the actual construction was 2 Kl/Sq m. Hence, the total embodied water in a typical urban construction in Calcutta, India was found to be 27.604 Kl/ Sq m of built area, compared to 20 Kl/ Sq m of Gross Floor Area as found by the research team in Australia. The present finding for the Indian building is about 38% higher than buildings in Australia. In other words, water consumed for the construction of the entire building translates into 8562021.56 Kl of water, equivalent to a cube of about 205 metre side and the amount of water needed by nearly 34 families with five members each for one whole year at 138 litres per capita per day (lpcd). In terms of share, the contribution of steel is the highest at about 97.6% and surpasses all other materials like cement and brick. The water consumption during the actual construction process was found to be only 8% of total embodied water of the materials together. This shows that water

consumption at material production stage i.e. the industries have to be more conscious about usage of fresh water and look for ways to bring this down through reuse and recycling. The emerging field of water governance may focus on this area and initiate drives that will achieve this goal. In future, water may prove to be an even more crucial challenge than energy, having far-reaching implications in areas of climate change, human habitation, health and economics.

5 Conclusion

Since water is everybody's business and any water disaster will affect population cutting across socio-economic classes, water mapping in building industry is not only significant to understand the dynamics of water resource consumption in one of the key sectors of urbanization, but also to select and decide on the most appropriate strategy to monitor and optimize this quantity for global sustainability and water management issues. This paper presented a study that intended to assess the possible range of water amount locked in the building fabric as its embodied water. It considers a live case study in the fast growing city of Calcutta and adopts a simple methodology to conduct this assessment. The result indicates the embodied water to be about 27.6 Kl per Sq m of built up area of a multi-storied apartment building of steel and RC construction. It has also assessed the percentage contribution of steel- the single-most water intensive material as well as that of the actual construction process in the total embodied water foot-print of the case-study. However, it is understood that one case-study with limited information on embodied water of building materials is not enough. Further research explorations into water foot-print estimation of individual materials and multiple case studies for different climatic zones of India will be required to reach substantial accuracy. In practice, thoughts and action towards water metering in industries as well as at construction sites may be imperative in immediate future to map and monitor this essential resource for over-all sustainable development.

Acknowledgements

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ANNEXURE- R10

"STOP CORONA;
WEAR MASK, FOLLOW PHYSICAL DISTANCING, MAINTAIN HAND HYGIENE"

DELHI JAL BOARD: GOVT. OF NCT OF DELHI
OFFICE OF THE EXECUTIVE ENGINEER (N) I
O.H.T. MUKHARJEE NAGAR, DELHI-09
Email :- eenorth1@gmail.com Ph. 011-27604862

NO/DJB/EE (North)-I/2021 -22/ 359 Dated:- 05.06.2021

To

The SE (Building) HQ
Civic centre,
North Delhi MCD,
New Delhi-110002

Subject:- Reference plan request vide ID No 10086152 at OBPS system of NDMC/MCD for issue of NOC for sanction of building plan .

There is shortage of water availability, therefore, water connection on completion stage will be sanction, subject to technical feasibility and availability of water at that time. Water line of 600 mm dia exists at Mall road which is 112 mtr. from the proposed site. Sewer line of 1100 mm dia UTS exists at Probyn road red light, which is 160 mtr. from the proposed site.

The report of DJB planning cell of water and sewer wing is attached with the term and conditions (enclosed).

I am directed to inform that service plan has been approved by the Competent Authority subject to the deposition of IFC calculated amounting to Rs. 9,37,93,764 by EE (Plg) W-I and Rs. 5,62,76,259/- by EE(Plg.)Dr. vide letter number DJB/EE(Plg.)W-I/2021/416 dt. 2/6/2021 & No. DJB/EE(Plg.)DR/ 2021/419-425 dt. 03.06.2021 respectively.

The size of ferrule shall be decided when water supply will be released as per situation of water supply at that time. Further in

the case when demand of water could not meet by the DJB due to scarcity of water, the applicant will arrange the water at their own cost.

You are requested to take further necessary action please.

Encl: As above

(S.K.SINGH)
EE(North)-I

OFFICE OF THE EXECUTIVE ENGINEER (PLG) DRAINAGE
DELHI JAL BOARD: GOVT. OF NCT OF DELHI
VARUNALAYA PHASE-I, KAROL BAGH, NEW DELHI

"Stop Corona Virus,Wear Mask,Follow Physicial Distancing, Maintain Hand Hygiene"

No.DJB/EE(Plg)DR/2021/ 419-425 Dated 03-06-2021

Subject: Calculation of sewage Dischare and Infrastructure Charges forRevised Layout for Group Housing Project at 1,3, Cavalry Lane & 4 Chhatra Marg,Near Vishwavidyalaya Metro Station New Delhi-110007

OBPS ID NO 10086152

The average daily sewage discharge for the above cited subject has been calculated as 456615 LPD including SSI and IFC amounting to Rs.5,62,76,259/-is applicable as per current rates. IFC has been calculated on the basis of built up areas of the properties in square feet and rates in different categories of colonies as per circular no DJB/DOR /Infra. Charges/2020/4957 to 5063 dated 06.10.2020 & DJB/DOR /Infra. Charges/2020-21/3714 to 3824 dated 11.05.2021 issued by Director (Revenue).Suitable adjustment in IFC for sewerage will be made by concerned office, if IFC for sewerage has been previously deposited by the applicant.

Sanction of sewer connection and levy of fees, charges, rentals, development charges, Infrastructure charges etc, would be in accordance to the provisions in Delhi Jal Board Act 1998 and Delhi Water & Sewer (Tariff and metering) Regulations 2012 as amended from time to time and applicable at the time of sanction of sewer connection.

Please note :-

1 Concerned maintenance division should ensure the deposition of all applicable charges/fee.
2 Special and General conditions are also enclosed.

Please take further necessary action in the matter.

Sd/-
EE(Plg)DR

EE(North)-I

Copy to:

1. CE(C/N) - with the request to take necessary action in the matter.
2. CE(Plg)DR - for kind information please.
3. DOR - for kind information please.
4. SE(Plg)DR- for kind information please.
5. SE(North) - with the request to take necessary action in the matter.
6. Jt. Dir. (Revenue) HQ- for kind information please.
7. Office copy

EE(Plg)DR

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Subject: Calculation of sewage Dischare and Infrastructure Charges forRevised Layout for Group Housing Project at 1,3, Cavalry Lane & 4 Chhatra Marg,Near Vishwavidyalaya Metro Station New Delhi-110007

OBPS ID NO 10086152

Special conditions for sanction of bulk Sewerage connection.

Based on the building plan submitted by applicant through online in (OBPS) the IFC and sewerage discharge has been assessed is as under.

1. The average daily sewage discharge for this Proposed scheme has been calculated as 456615 LPD and IFC amounting to Rs.5,62,76,259/-is applicable. IFC has been calculated on the basis of built up areas of the properties in square feet and rates in different categories of colonies as per circular no DJB/DOR /Infra . Charges/2020/4957 to 5063 dated 06.10.2020 & DJB/DOR /Infra. Charges/2020-21/3714 to 3824 dated 11.05.2021 issued by Director (Revenue). In case of any change in the built up area later on accordingly IFC will be reworked out on prevailing rates by concerned maintenance division and applicant is liable to pay the difference.
2. No addition in the building(s) development is to be taken up without prior approval of DJB.
3. If any addition/alteration is made in the proposed plan in future, the applicant will submit the revised plan/scheme to DJB for revision of sewage discharge
4. The Proponent /Developing Agency will provide its own arrangement for collection of the sewage generated, its treatment and the disposal of the same till the peripheral/trunk sewer system is made available by Delhi Jal Board. The STP and septic tank or any other arrangement will be provided by the Proponent /Developing Agency strictly as per the provisions of latest building Bye-laws, CPHEEO guidelines, all IS Codes and as per the guidelines of Central/State Environment Department /CPCB/DPCC as applicable.
5. The sewerage scheme being approved by DJB are based on approved layout plan/approved building plans forwarded by the developing agencies like DDA, MCD and any other local authorities having statutory powers to do so.
6. The sewage for Hospital/Hotel/workshop shall have to be treated as per the requirement of latest building Bye-laws and guidelines of CPHEEO manual and relevant IS codes before releasing into DJB network.
7. The operation and maintenance of the sewerage system inside the premises/individual campus upto the connection point from the DJB sewer line would be with the Proponent/Developing Agency/Occupier. DJB shall not be liable /responsible for any mishap/untoward incident inside such campus/premises.
8. The allocation /allotment/marking of the spaces for construction of STP /sewage pumps house/ any other ancillary activities for the purpose /purposes of development work of sewerage system is not being suggested/advised by DJB as this is the responsibility of the layout plan/building plan approving authority. All such activities would be based on the approved layout /building plans under the provision of latest building bye-laws applicable in the Govt. of NCT of Delhi.

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relevant BIS codes, CPWD specifications and other standards and statutory provisions relevant

9. Environment clearance as applicable under the provisions of latest building Bye-laws and statutory provisions should be acquired by the Proponent/Developing Agency of the project from the appropriate authority /authorities like Central/State Environment Department/CPCB/DPCC etc. whichever is /are applicable.
10. The regulation of quality of Treated Effluent, its Standard, Operation and Maintenance of the STP/SPS/Sewerage system will be as per the guidelines/instructions of the Authority concerned and Proponent/Developing Agency of the project will be solely responsible for implementation of all such guidelines prescribed by the concerned Authority dealing with such regulations. Delhi Jal Board in any manner shall not be responsible for the violation of the regulations.
11. The construction/design/operation and maintenance of the STP/SPS /Sewerage system is the sole responsibility of the the Proponent /Developing Agency of the project.
12. The guidelines as of CPHEEO manual (of Department of Housing and Povery Alleviation), relevant BIS codes, CPWD specifications and other standards and statutory provisions relevant to sewerage system would be binding on the Proponent /Developing Agency of the project.
13. Any building having up the consumption of water 12500 litre per day and above subsequent generation of 10,000 litre per day and above of sewage will make a provision of a recycling system of waste water for Horticulture and other non drinking purposes as per the provision of latest building Bye- laws and CPHEEO (Department of Housing and Poverty Alleviation, Govt. of India. The responsibility of operation and maintenance of STP/SPS etc. will lie with the proponent /Developing Agency/Occupier only.
14. If a recycling plant (Waste Water Treatment Plant) is provided in the premises as per condition no.13 above and bypass of sewage is observed into DJB sewerage system without prior intimation, penalty will be levied as per prevailing policy of DJB for their lapses from the proponent/ develoing agency/occupier.
15. Onus of integrating sewer connection with the existing internal/peripheral/trunk sewer of DJB either by gravity or through a pumping main in consultation with the Zonal authorities, lies with the proponent/ develoing agency/occupier. The applicant is advised to connect the sewer out fall of the premises, with DJB internal/peripheral/trunk line with the perimission of concerned EE(Maintenance), in order to eliminating the possibility of any back flow, in case of any surcharge of internal/peripheral/trunk line , under unavoidable circumstances.

EE(Planning)DR

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67/C

Subject: Calculation of sewage Dischare and Infrastructure Charges forRevised Layout for Group Housing Prpject at 1,3, Cavalry Lane & 4 Chhatra Marg,Near Vishwavidyalaya Metro Station New Delhi-110007

OBPS ID NO 10086152

GENERAL CONDITIONS TO BE FULFILLED REGARDING THE SEWERAGE SERVICES OF THE NEW COLONIES TO BE DEVELOPED:-

GENERAL: -

1. The concerned EE Maintenance shall be kept informed from the very start of the work and at every stage during the progress so that the inspection could be arranged. The sanctioned plans should be made available at site at the time of inspection.
2. The Colonizer/DDA/Society shall provide all reasonable facilities for the inspection of work during execution.
3. No line should be covered until 7 days clear notice for the same has been given.

SEWERAGE: -

1. Distance between manholes shall not exceed 20M centre to centre for sewers up to 400 mm dia 30M for sewers above 400 mm dia and these shall be so spaced that each facilitate discharge in the direction of flow. However the spacing shall not be more than 20M in case of internal sewer.
2. The manhole sizes will be as follows:

   A. 3'-0" (0.91m) dia circular manholes with heavy covers for depth beyond 3'-0" (0.91m) up to 5'-6" (1.67m).

   B. 4'-0" (1.22m) dia circular manhole with heavy covers for depths beyond 5'-6" (1.67m) and up to 7'-6" (2.29m).

   C. 5'-0" (1.52m) dia circular manholes with heavy covers for depths beyond 7'6" (2.29m) minimum internal dia of manhole shall be dia of pipe+2'-00" (0.61m).

3. All manholes will be plastered both inside and outside with CM(1.4) inside to be finished with floating coat of Neat cement and shall be provided with plastic encapsulated foot rests as per approved specifications of this department in place of C.I foot rests.
4. Extra excavation should be done under the joints for providing joints properly, so that there is no infiltration.

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5. Concrete bedding shall be provided as per sewerage manual.
6. The minimum size of sewer shall be 250mm dia, irrespective at actual peak discharge.
7. When the sewer is to be laid under S.S. Water, 23cm thick stone soling is required under concrete bedding of required thickness under manhole and 15cm thick stone soling under concrete bedding of required thickness under sewer pipes.
8. In case I.L. of the sewer from a colony is higher by more than 60 cm than the I.L. of municipal sewer at connecting manholes, drop connection shall be provided as per C.P.W.D specification.
9. Crossing of Nallas etc. shall be done by C.I Pipe.
10. Heavy duty circular steel fiber reinforced concrete manhole frame and cover, 560 mm internal dia both weighing 182kg. to be tested as per I.S.1726(T) for heavy duty load shall be used.
11. The manhole covers shall have the following markings: -
    1. Sewer. H.D.
    2. Name of Department.
    3. Year of manufacturing.
    4. BIS/ISI marked.
12. Three sets of completion plans in ink with design calculations should be submitted to this office by the colonizer/agency while handing over the services of the society/area.
13. Entire work shall be carried out strictly as per CPWD and Municipal specifications whichever is applicable.
14. All corrections made on the plan and design calculations shall be strictly adhered to.
15. The reference benchmark shall tally with GTS benchmark.
16. The Owner shall take prior written permission from the SE, sewer maintenance of concerned zone for making connection of its sewerage system with peripheral/ trunk sewer.
17. No storm water drain shall be connected into the sewerage system.
18. The drop connection shall be provided at all the points where fall is more than 60 cms.

Ex. Engineer (Plg) DR

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No: DJB/EE (Planning) W-I/2021/ 416 **Date:** 8/6/2021

Sub:- Calculation of Water Demand and Infrastructure Fund Charges for Revised layout for Group Housing Project at 1,3,cavalary lane & 4 Chhatra Marg , near Vishwavidhyalaya metro station , New Delhi-110007.
Reference:- OBPS ID No.10086152

Please refer to above cited OBPS application , the total average water demand assessed to 456615 LPD out of which the potable water demand is 319155 LPD and non potable water demand is 137460 LPD as per prevalent norms of DJB. According to revised IFC levy policy Circulated from the office of DOR, DJB, dated 06.10.2020, and the drawings and data/ details of measurements available with this OBPS application IFC for water has been assessed to Rs.9,37,93,764/-Only.

Sanction of water connection/ additional water connection/ increase in existing water connection and levy of fees, charges, rentals, development charges, proportionate charges/central storages charges/Infrastructure charges/ additional Infrastructure charges etc. would be in accordance to the provisions in Delhi Jal Board Act 1998 and Delhi Water & Sewer (Tariff and metering) regulations 2012 as amended from time to time and applicable at the time of sanction of water connection/ additional water connection/ increase in the size of existing water connection.

Levy of fees, charges, rentals, development charges, proportionate charges/central storages charges/ Infrastructure charges/additional Infrastructure charges etc. for the existing water connection(s), if any, would be in accordance to the provisions in Delhi Jal Board Act 1998 and Delhi Water & Sewer (Tariff and metering) regulations 2012 as amended from time to time and applicable at the time of sanction of additional water connection/increase in the size of existing water connection as the case may be.

Please note:-

- Concern maintenance division should ensure the deposition of all applicable charges/ fee.
- Infrastructure fund charges already deposited, if any, shall not be refunded.
- Special conditions and general conditions are also enclosed.

Please take further necessary action in this matter at your end.

Issued with the approval of the competent authority.

Encl:- As above

EE(North)-I

(Bhupesh Chandra Patel)
EE (Planning)W-I

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Special conditions for sanction of Bulk Water Connection

Sub:- Calculation of Water Demand and Infrastructure Fund Charges for Revised layout for Group Housing Project at 1,3,cavalary lane & 4 Chhatra Marg , near Vishwavidhyalaya metro station , New Delhi-110007.

Reference:- OBPS ID No.10086152

Based on the plans submitted by applicant through Online Building Plan Sanction Portal the IFC and water demand has been assessed.

1. Applicant has to deposit the amount of **Rs. 9,37,93,764**/= only, towards the cost of INFRASTUCTURE FUND CHARGES. If there is any change in built up area later on, accordingly IFC will be reworked on prevailing rates by concerned maintenance divisions and applicant is liable to pay the difference.
2. Total water requirement of the premises has been assessed to **456615 LPD** out of which the potable water requirement is **319155 LPD** and Non-potable water requirement is **137460 LPD**.
3. The height of construction i.e. No. of story's shall be restricted to as per approved drawings submitted by the applicant.
4. DJB shall provide water for potable requirements only if technical feasibility exist. Non-potable component shall be met through use of recycled water having quality standards as per CPHEEO guidelines.

Quality Standards for Recycled Water

	Parameter	Toilet flushing	Horticulture Use
1	Turbidity(NTU)	<2	<2
2	SS	nil	Nil
3	TDS	2100	
4	pH	6.5 to 8.3	
5	Temperature°C	Ambient	
6	Oil & Grease	10	10
7	Minimum Residual Chlorine	1	1
8	Total Kjeldahi Nitrogen as N	10	10
9	BOD	10	10

73/C

14. The regulation of quality of Treated Effluent, its Standard, Operation and Maintenance of the recycling plant/BPS/water supply network will be as per the guidelines/instructions of the Authority concerned and Applicant/Developing Agency of the project will be solely responsible for implementation of all such guidelines prescribed by the concerned Authority dealing with such regulations. Delhi Jal Board in any manner shall not be responsible for the violation of the regulations.
15. The construction/design/operation and maintenance of the recycling plant/BPS/water supply network is the sole responsibility of the Applicant /Developing Agency of the project.
16. Internal water supply network including recycling plant arrangement shall be done & maintained by applicant/developing agency as per the sound engineering practices and relevant prescribed standards.
17. The guidelines as of CPHEEO manual (of Department of Housing and Poverty Alleviation). Relevant BIS codes, CPWD specifications and other standards and statutory provisions relevant to water supply network would be binding on the Proponent/Developing Agency of the project.
18. Sluice valves will be provided for regulation of water supply system as per the requirements. These shall conform to IS: 2685-1971. A clear space of about 200 mm should be kept between the top of the sluice valve spindle and surface box so that valve cap may be easily provided, when the surface box is kept in flush with road level.
19. Water harvesting through storing of runoff water including rain water in all new building on plots of 100 sq. meters. & above shall be mandatory. The plans submitted to the local bodies shall indicate the system of storm water drainage along with points of collection of the water in surface reservoirs or in recharge wells. These provisions will be applicable as per the Public Notice (s) of Central Ground Water Authority issued from time to time.

    As per the modular designs of recharge Chambers for roof top Rain Water Harvesting available on DJB website, a retention capacity of 2 m^3 is required for 100 m^2 of roof top area. For more details office of EE(RWH), DJB and website of DJB is to be referred.
20. All buildings having a minimum discharge of 10,000 liters per day and above or water demand of 12.5 KLPD and above shall incorporate waste water re-cycling system. The recycled water shall be used for horticultural & flushing purposes.
21. All the general conditions attached along with these special conditions shall be strictly followed at the time of execution and maintenance.
22. An underground reservoir of required capacity shall have its top water level (T.W.L.) below the ground level but top of underground reservoir should be at least 30 cm. above the normal G.L.
23. Pumps of adequate capacity and head shall be provided with 100% standby arrangement so that water may reach up to the desired head. In addition alternate arrangement of diesel pump may also be made so that the same can be used at the time of electricity failure or shall install diesel driven generator set of required capacity in lieu of diesel pump set.
24. In case of population increase on the basis of approved layout plan of the premises by MCD/ DDA, No. of shifts and there is any variance then file shall be re-submitted again in this office for revision of IFC.
25. Onus lies on the applicant to integrate sewer connection with the existing internal/peripheral sewer either by gravity through a pumping main in consultation with the Zonal authorities. "the applicant is advised to connect the sewer out fall of the premises with DJB internal/peripheral line eliminating the possibility of any back flow in case of any surcharge of internal/peripheral sewer under unavoidable circumstances".

26. The feeder mains from approved peripheral water supply scheme to proposed underground tank for potable water shall be designed at the time of making connections as per availability

72/C

10	COD	AA	AA
11	Dissolved Phosphorous as P	1	2
12	Nitrate Nitrogen as N	10	10
13	Faecal Coliform in 100 ml	Nil	Nil
14	Helminthic Eggs/litre	AA	AA
15	Colour	Colourless	Colourless
16	Odour	Aseptic which means not septic and no foul odour	

5. The applicant/Developing agency has to make its own arrangements for treatment to achieve quality standards for the recycled water and is permitted to use the same for flushing purposes/Horticulture uses. Necessary arrangements for dual piping shall be made by the applicant/developing agency for the purpose.
6. There may be acute shortage of filtered water in the area and as such it may not be possible to provide water presently. Individual Plot holder shall make their own arrangement to provide potable quality of water to meet interim water requirements till filtered water can be made available by DJB.
7. The required permission from CGWA/ CGWB, MCD, DDA or any other agency if any, for making interim water arrangement, shall be taken by developing agency/applicant. DJB shall not be responsible for the same.
8. In case the interim arrangement of water is not found fit, it shall be entire responsibility of applicant/developing agency to arrange potable safe drinking water. DJB shall not be responsible in any way for the consequences so raised due to non-availability of water from the interim arrangements or otherwise made by the developing agencies.
9. A suitable dia bulk water meter shall be installed by the applicant/developing agency at the suitable location in consultation with the concerned Maintenance division at its own cost. The connection and the communication pipe shall also be laid by the applicant/developing agency at their own cost.
10. Sanction of the water connection shall be in accordance to provisions in Delhi Water and Sewer (Tariff and Metering) Regulations 2012 and notifications of DJB from time to time in respect of provisions for water supply i/c conditions contained in the release letter.
11. Development plan/Approved Building floor plans submitted by the applicant shall be verified at the time of sanction of bulk water connection by the concerned Zonal Authorities of DJB. In case of variation/ deviation found in the constructed building from the plans submitted by the applicant at the time of sanction of water supply scheme or in OBPS, then in such case IFC shall be re-assessed by concerned maintenance division.
12. Deposition of Infrastructure charges will not entitle the applicant/developing agency for immediate water connection by the DJB. Water connection will be sanctioned by concerned Maintenance division as per available feasibility of DJB water in the area. In case, DJB water is not available, applicant will have to make its own arrangement of water till DJB water is available. The required permission from the Advisory Committee under DC (Revenue) or any agency if any, for making interim water arrangement shall be taken by the applicant.
13. Environment clearance as applicable under the provisions of latest building Bye-laws and statutory provisions should be acquired by the Proponent/Development Agency of the project from the appropriate authority /authorities like Central/State Environment Department/CPCB/DPCC etc. whichever is /are applicable.

of water by the concerned Maintenance division with the consultation of planning cell (if required).

27. Sanction of water connection/ additional water connection/ increase in existing water connection and levy of fees, charges, rentals, development charges, proportionate charges/ central storages charges/ Infrastructure charges/ additional Infrastructure charges etc. would be in accordance to the provisions in Delhi Jal Board Act 1998 and Delhi Water & Sewer (Tariff and metering) regulations 2012 as amended from time to time and applicable at the time of sanction of water connection/ additional water connection/ increase in the size of existing water connection.
28. Levy of fees, charges, rentals, development charges, proportionate charges/ central storages charges/ Infrastructure charges/ additional Infrastructure charges etc. for the existing water connection(s), if any, would be in accordance to the provisions in Delhi Jal Board Act 1998 and Delhi Water & Sewer (Tariff and metering) regulations 2012 as amended from time to time and applicable at the time of sanction of additional water connection/ increase in the size of existing water connection as the case may be.
29. Hon'ble NGT, Principal Bench, New Delhi, vide his orders in the case of O.A. 72/2014, the applicant/Developing Agency shall construct adequate capacity of rain water harvesting system as part of the project.

27/6/2017

(Bhupesh Chandra Patel)
EE (Plg) W-I

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GENERAL CONDITIONS

1. The pipes used in the distribution system shall conform to ISI specifications. For water pipes, C.I. pipes shall be of class L.A. and D.I. pipes shall be of class K-7/K-9 having rubber ring push on joints.
2. Pipes shall be laid with the minimum cushion of 0.60 m under the berms and 1.00 m under the roads.
3. Special care should be taken to ensure an adequate horizontal & vertical separation between water & sewer pipes. As far as practicable, the lateral separation should be at least 3 meters & vertical separation should be at least half meters. A water main should not be laid or passed through the manhole of sewer pipe line and without housing pipe through open sullage/storm water drains.
4. All water distribution mains shall be tested at twice the maximum working pressure of pipes. All joints should be absolutely water tight under the test.
5. Except where stated otherwise, the latest Indian standard codes of practices with up to date revisions shall be adopted for laying water pipes, construction of underground reservoirs and for internal fittings in buildings.
6. MDPE (Medium Density Polyethylene) pipes conforming to I.S. specification shall be used for individual water connections.
7. Sluice valves used shall be I.S.I marked or of reputed firms namely Kilburn, Kirloskar, William Jacks and Indian Valve Co.
8. Proper indicating plates shall be provided at prominent places to indicate the location of Sluice Valves, fire hydrants etc.
9. The fire hydrant shall conform to I.S. 905-1975 with up to date revisions.
10. Plumbing of each D.U. shall be so carried out such that separate ferrule connections can be provided from the distribution water line.
11. Sluice valves will be provided for regulation of water supply system as shown in the approved plan.
12. Plumbing work shall be carried out as per National Building Code and Building Bye Laws as applicable to high rise Buildings.
13. The domestic water tank should not be connected with the static water tank meant for firefighting storage or gardening.
14. The underground reservoirs & B.P.S shall not be located in the mandatory tot lot areas, as per directives of D.U.A.C./DDA.
15. The Developing Agency shall intimate to the concerned Executive Engineer (Maintenance) of the regarding the actual date of start of laying and jointing of water mains at site and will have the work inspected during execution.
16. Water mains shall be disinfected by flushing with water containing bleaching powder @ 0.5 gm/liter of water and cleaning the same with fresh water. Operation to be repeated three times including getting the samples of water from the disinfected main tested and approved from Director, Treatment & Quality Control, Chandrawal Water works No. II, Civil Lines, Delhi.
17. Three sets of completion plans showing spot levels, location and size of water mains, fire hydrants, sluice valves, Air valves, Scour valves etc, in ink shall be supplied at the time of handing over the distribution system to the concerned Executive Engineer.
18. The developing agency shall connect their internal distribution system with DJB water main at their own cost after getting the approval from this department.
19. When no drinking water supply can be made available in the near future by this deptt. and tube well is the permanent or interim source of water Supply, its Yield, provided must be sufficient to meet the ultimate average daily water requirement.

69/c

20. Till drinking water made available by DJB the developing agency shall maintain interim arrangements & shall also not claim drinking water supply from DJB, during the intervening period.
21. When the drinking water is made available by DJB the developing agency will apply to this office for approval of water connection. The Developing Agency/beneficiaries shall connect their water distribution system to the water main at their own cost and after deposition of required charges in the zonal office, completing necessary formalities with the concerned EE.
22. Before any bore is converted into tube well. The developing agency shall have a Chemical analysis of water samples done from the office of the Director Treatment & Quality Control, Chandrawal Water Works No. II, Civil Lines, Delhi to avoid in fructuous expenditure. A final certificate regarding the suitability of water of each tube well for drinking purpose shall be submitted in this office. The water samples from the tube well/wells shall be got examined from the said officer of this deptt. at regular intervals of four months and certificates **"FIT FOR HUMAN CONSUMPTION"** submitted in this office. Specifications and design of the tube wells, pump houses and pumping sets for each tube well and details of the reservoir shall be got approved from this office before execution.
23. A proper gate and boundary wall as per standard design shall be provided around each tube well, pump house, ground reservoir etc. In addition a water closet and an enquiry office shall be provided at the site of the tube well and reservoir etc.
24. Developing agency shall also install diesel pump sets of designed capacity at the pump House to maintain water supply during power breakdown/ failure or shall install diesel driven generator set of required capacity in lieu of diesel pump set.
25. The tube well shall be located in plot of at least 30 meters x 30 meters size.
26. At the time of handing over the services the developing agency shall be required to handover the underground reservoir, tube well, pumping sets, etc. in good running conditions, free of charge.
27. The building activity, shall be allowed only after the developing agency has carried out the following works to the satisfaction of this department:-

a) Internal services and interim arrangements of water supply have been provided.
b) Peripheral sewers laid with proper disposal or interim sewage disposal arrangement made.
c) Peripheral & internal storm water disposal arrangements have been made.

28. The fire hydrants should be provided preferably on 150mm dia or above water main proposed in the water supply scheme.
29. The fire hydrants are to be provided preferably on the water main proposed along main roads as it will facilitate movement of fire fighting equipments.
30. Fire hydrants should be located at distance of 150 meter centre to centre in the Distribution system in such a way that a fire hydrant is available within a distance of 75 meter anywhere in the system.
31. The fire fighting arrangements including position of fire hydrants shall also be got Approved from Chief Fire Officer, Delhi and one copy of the approval letter be sent to this office. These should invariably be installed near the proposed markets, institution, social & religious places and in and around residential areas.
32. The developing agency shall provide by-pass arrangement from the feeding main to Distribution system which shall be got approved from this office.
33. In case there is any change in the category for House Tax by the Delhi Municipal Corporations concerned, then accordingly IFC for the same would be applicable.
34. The department reserves the right to delete, add, or charge any of the conditions of approval of this proposal.
35. In case of any contradiction, the conditions in the special conditions shall prevail over general conditions.

21/6/2007

(Bhupesh Chandra Patel)
Executive Engineer (Planning) W-I

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ANNEXURE-R11

Date: 09.03.2018

09/03/18

To,
The Secretary
State Expert Appraisal Committee
Delhi Pollution Control Committee
4th Floor, ISBT Building, Kashmere Gate,
Delhi-110006

INWARD COUNTER)
POLLUTION CONTROL COMMITTEE
DEPARTMENT OF ENVIRONMENT
GOVT. OF NCT OF DELHI
4TH FLOOR, ISBT BUILDING,
KASHMERE GATE, DELHI-110006

Sub.: Amendment in Environment Clearance for Group Housing Complex Project At 1 & 3 Cavalry Lane & 4 Chhatra Marg at Civil Lines (Adjoining Vishwa Vidyalaya Metro Station), Delhi by M/s Young Builders Pvt. Ltd.

Ref: Minutes of the 95th Meeting of the SEAC, Delhi dated 24.02.2018

Dear Sir,

We are herewith submitting updated point wise reply of shortcomings raised during 95th SEAC, Delhi meeting held on 24.02.2018 for your reference.

Hope the reply meets your satisfaction.
Kindly grant us the environmental clearance at the earliest.

Thanking You.

Yours Sincerely,
For M/s Young Builders Pvt. Ltd.

Rajiv Ranjan Sharma
Vice President - Projects

Point-wise reply to the queries raised during 95th SEAC, Delhi, meeting dated 24.02.18 w.r.t. Amendment in EC of Group Housing Complex, located at 1 & 3 Cavalry Lane and 4 Chhatra Marg at Civil Lines Delhi by Young Builders Pvt. Ltd..

1. Revised water mass balance chart with minimum excess waste water discharge in rainy and non-rainy season and with action plan to re-use/recycle the excess treated water

Reply: Revised water mass balance with maximum possible reuse plan is attached as Annexure-I.

2. Schematic drawing of proposed STP of enhanced capacity.

Reply- STP schematic drawing for 200 KL capacity is attached as Annexure-II.

3. Plan for handling the excavated earth is required to be submitted along with revised EMP (Environment Management Plan) for dust mitigation measures as per MoEF Notification No. GSR 94 (E) dated 25.01.2018 incorporating the provisions of spraying nozzles for dust suppression and frequency of spraying.

Reply: Approx. 1, 50,000 m^3 of earth will be excavated for the project which will be disposed through local approved vendors.

Environment Management Plan to be followed for dust mitigation:

- Roads leading to project site are paved/blacktopped.
- Wind-breaker of 10 meters height shall be provided along the periphery of project site.
- Water sprinkling system shall be put in place for dust control. Mechanical Spray Nozzles has to be installed and sprinkling will be done 2 to 4 times in a day depending on the climate.
- No loose soil shall be stored at site.
- Transportation of construction material and excavated earth will be done through covered trucks.
- Construction material will be stored within project site under yards.
- Grinding and cutting of building material will not be done in open area.
- Dust mitigation measures shall be displayed prominently at project site for easy public viewing.

4. Details/location of ambient air monitoring points in basement including the ventilation cycle of fresh and recycled air.

Reply: Lower and upper basement plans showing location of ambient air monitoring points and ventilation points are attached as Annexure-III.

5. Point-wise comments on the issue raised vide circular no. J-11013/71/2016-IA.I(M) dt: 25 October, 2017 are required to be furnished.

Reply: Point-wise response to the points stated in MoEFCC circular no. J-11013/71/2016-IA.I (M) dt: 25 October, 2017 is attached as Annexure-IV.

6. Traffic Management Plan taking into consideration the latest traffic scenario.

Reply: Revised traffic management plan is attached as Annexure-V

7. Landscape Plan with Demarcation for total green area and soft green area.

Reply: Landscape Plan with details of total green (6079.88 sqm) and soft green area (3005.55 sq m) is attached as Annexure-VI.

8. Proposed Plan for implementation of renewable energy.

Reply: 1% of total electrical load will be fulfilled from solar energy. Details attached as Annexure-VII (a).

Plan showing location of solar panels is attached as Annexure-VII (b).

Annexure - I

Revised Water Calculations & Water Mass Balance

The total water requirement for the project will be approx. 257 KLD, out of which domestic water requirement is 214 KLD. The fresh water requirement is approx. 157 KLD. The water will be supplied by Delhi Jal Board. The revised daily water requirement calculation are given below in Table 1:

Table 1: Revised Calculations for Daily Water Demand (EC Accorded + Amended)

S. No.	Description	Occupancy	Rate of water demand (lpcd)	Total Water Requirement(KLD)
A.	Domestic Water			
	Residential	1,161	135	157
	EWS	380	135	51
	Staff (maintenance) Visitors	58 116	45 15	2.6 1.7
	Staff (shops)	30	45	1.35
	Community Building	40	15	0.60
Domestic Water (A=I+II+III−IV−V)				214
B.	Horticulture (6079.88 m²)		7 lt./sqm/day	43 KLD
Grand Total (A + B) - 257 KLD				

Table 2: Wastewater Calculations

Domestic Water Requirement	224 KLD
• Fresh water (@ 70% of domestic)	157 KLD
• Flushing (@ 30% of domestic)	67 KLD
Waste Water Generated (@ 80% fresh + 100% flushing)	125 + 67= 192 KLD

The revised water balance diagram is shown below in Figure 1:

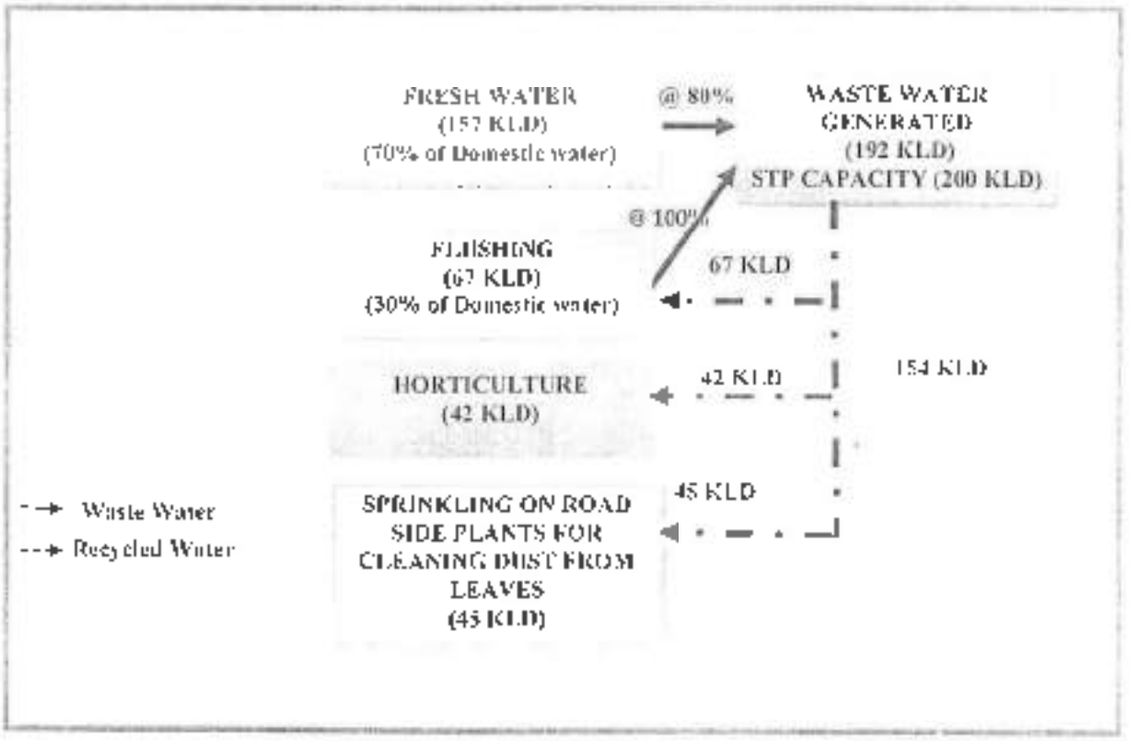


Figure 1: Revised Water Balance Diagram

Wastewater Generation & Treatment

It is expected that the project will generate approx. 192 KLD of wastewater. The wastewater will be treated in STP of 200 KL capacity provided within the complex generating 154 KLD of recoverable water from STP which will be recycled within the project for Flushing, Horticulture, etc

ANNEXURE -R12

Manual on norms and standards for environment clearance of large construction projects

Ministry of Environment and Forests,
Government of India

1046

Manual on norms and standards for environment clearance of large construction projects

Ministry of Environment and Forests,
Government of India

Suggested format for citation

Manual on norms and standards for environment clearance of large construction projects
New Delhi.

PREFACE

"……Presently, we are generating one trillion units of power for a billion population with certain economic strengths. And also we are using nearly 800 billion cubic meters (BCM) water both ground and surface. Our aim should be to conserve at least 10 to 15% of energy i.e. 100 billion units and 10% of water namely 80 BCM which will have a large impact on our economy. A good part of the nation's energy is consumed by the construction industry and the household. By saving energy through Green buildings, we will make the air much purer to breathe. Green is safer, economically attractive and above all healthy. I would suggest that this should be the basis …… to deliberate and prepare a decadal plan for the nation for implementation. "

(Excerpts from the speech on 15.9.05 at the Green Building Congress in New Delhi by Dr A P J Abdul Kalaam, President of India)

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CHAPTER 2 Water management

2.0 Introduction

In India, there is a growing demand on the existing water resources, which includes the river water sources, precipitation and ground water sources. Estimates reveal that by 2020, India's demand for water will exceed all sources of supply. It is projected that India would fall into the water-stressed category by 2025. Per capita water consumption in 1990 was 2,464 m^3 per capita per annum, but by 2025 with an expected population of 1.4 billion, it will almost certainly be in the stress category with less than 1,700 m^3 per capita per annum. The demand supply gap by 2050 shall be about 50 billion m^3 which translates into nearly 0.3 billion individuals foregoing water (assuming a per capita requirement of 150 L/ day). In addition to the huge gap in demand-supply, the distribution across various regions and zones of cities is highly varied.

2.1 Issues of concern

Water is the most important component for any society and is an important sustainable development indicator. The objective of any planned development should be to provide and ensure adequate, reliable and good quality potable water to its inhabitants. Water use in a residential building includes the demand for human consumption, cleaning, washing, flushing and gardening. The proportion of water use for various applications is shown in Figure 2. 1. For the commercial and institutional buildings, the additional demand include those for the utilities such as air conditioning, fire protection etc. It is important that any sustainable urban development project should integrate the sustainable and environment friendly water management plan at the design stage

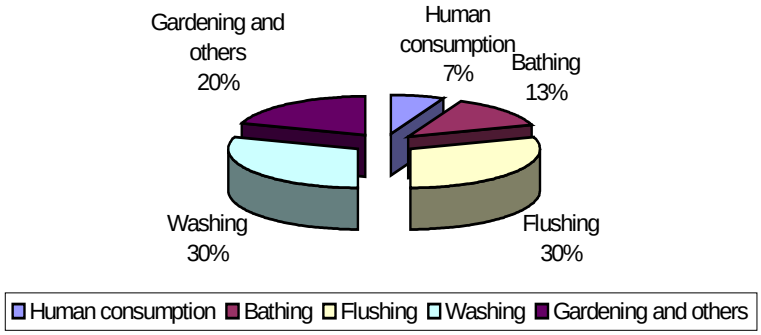


Figure 2.1: Water use in buildings

2.2 Scope of the section

Water management includes various aspects such as water conservation, wastewater treatment, rainwater harvesting, reuse and recycling of water etc. The objective of this section of the manual is to give guidelines to the developers and builders, on various aspects of water management. This section covers following issues:

1. Minimizing the demand of water required within building, landscape, process (air-conditioning etc) and construction.
2. Techniques, best practices and standards for recycling of wastewater
3. Minimize the load on the municipal supply and groundwater sources through recycling of water
4. Techniques for rainwater harvesting including estimation of the potential of rainwater harvesting for different region.
5. Measures for quality control of various water source such as fresh water, underground water, municipal, tankers, rainwater and recycled water.

2.3 Mitigation technology options

2.3.1 Water conservation within buildings

Minimizing the water demand within buildings is the first and foremost step in water management. Water conservation helps to ensure that this important resource will be available for many generations to come. Conserving water also indirectly saves energy, which is needed to process, treat, transport and in cases of areas having cold climate to heat water. Hence to have the maximum savings, optimal and economical use of water through water conservation should be the priority of the new constructions. In addition to technical measures such as use of water efficient domestic appliances, there is a need to create awareness and to educate people to address water leakage problems through proper maintenance of fixtures.

2.3.1.1 Water usage within buildings.

In India, the average domestic water consumption is 4.1% of the total water use. As per the Bureau of Indian Standards, the per capita water requirement varies with building type.
As per BIS, for residential buildings with a population of 20,000-1,00,000, the per capita consumption is 100-150 lpcd and for those with population above 1,00,000 , the consumption is 150-200 lpcd. Out of the 150 to 200 litres per head per day, 45 litres per head per day may be taken for flushing requirements and the remaining quantity for other domestic purposes.

For the other types of buildings, the water requirement varies between 30 to 340 LPCD. The details of the water demand of other buildings is given in Table 2.1.

Table 2.1: Water requirements for different types of buildings

Sl. No	Type of Buildng	Consumption (litres/day)
i)	Factories with bath rooms	45 per head
ii)	Factories without bath rooms	30 per head
iii)	Hospital (including laundry):	
	a) Number of beds not exceeding 100	340 per head
	b) Number of beds exceeding 100	450 per head
iv)	Nurses' homes and medical quarters	135 per head
v)	Hostels	135 per head
vi)	Hotel (up to 4 star)	180 per head
vii)	Hotel (5 star and above)	320 per head
viii)	Offices	45 per head
ix)	Restaurants	70 per seat
x)	Cinemas, concert halls and theaters	15 per seat
xi)	Schools	
	a) Day schools	45 per head
	b) Boarding schools	135 per head

In addition, water demand of visitors to these building is considered as 15 LPCD

Source: National Building Code, 2005

2.3.1.2 Quantification of water demand in buildings

For every new development/construction, the initial step should be to assess the impact of the development on the available water resource. The amount of water demand can be calculated based on the occupancy of the building and the per capita consumption as given by BIS for different categories.

Total quantity of water used= Occupancy x Quantity (LPCD)

2.3.1.3 Water saving practices and their potential

Water usage for applications such as flushing, bathing and washing is as high as 93% of water demand in any building. However, measures can be adopted to reduce this demand through use of water efficient practices and devices (efficient plumbing fixtures). These would result in significant saving of water and contribute towards protection of the environment. Some of the common practices and devices that can save water are covered below:

1. Monitoring water use: Use of water meter conforming to ISO standards should be installed at the inlet point of water uptake and at the discharge point to monitor the daily water consumption. This would also enable the user to identify if there are any points of leakages.
2. Use of water saving devices/ fixtures: About 40% of all water used indoors is in the bathroom and toilets and more than 10% of that used is in the kitchen. The

conventional fixtures used in toilets use water at the rate of 12-15 litres per flush. In normal scenario, the taps and showerheads in buildings consume water at the rate of 20 litres of water per minute. The flow rates of these fixtures depend on the pressure at which these are operated. However there exists the opportunity to lower the consumption through the use of following efficient fixtures:

- Low flow flushing systems: Water consumption is more for flushing applications in any building. Use of more efficient water saving toilets having dual flush system can result in a saving of atleast 50% of water. Dual flush systems can be installed in order to allow different volume of water for flushing liquids and solids. To facilitate efficient cleaning at low volume, it is possible to install suitable water closets.
- Sensor based fixtures: Sensors based fixtures functions only in the presence of user. Various types of sensor based technologies are magic eye sensor for urinals, solenoid self-operating valves etc. Infrared and ultrasonic sensors discharge a set amount of water only when the taps are being used thus resulting in water saving as compared to manually operated valves. In addition to its advantage in reducing water consumption, sensor-operated taps also result in better hygiene particularly in a public place.
- Urinals: By using automated flushing urinals usage of water is very high. By replacing these with sensor-based urinals such as magic eye sensor, the water use is reduced to 0.4 litres per flush. In place of conventional urinals, if the low flow urinals are used, water saving amounts to 3 litres per flush.
- Waterless urinals: Waterless urinals are an efficient technique to save water. The system works without any water but with the use of biodegradable liquid in the cartridge fitted at the bottom of the urinal. Each cartridge is adequate for 7000 uses.
- Water taps: A normal tap works at a flow rate as high as 20 lpm. Use of low flow faucets along with other water saving devices such as auto control valves, pressure reducing devices, aerators and pressure inhibitors for constant flow, magic eye solenoid valve, self operating valves can result in 25 – 50% of water savings.
- Showerheads: In a conventional shower, water is delivered at the rate of 20 litres of water per minute at a pressure of 60 psi. A significant reduction in water consumption is possible through use of low flow shower which results in a flow of 7.5 lpm at design pressure of 80 psi. Flow restrictors and temporary cut-off valves can further save water. In addition to the use of low water

consuming fixtures, it is also possible to introduce other features such as aerators, use of spray nozzles, automatic shut-off nozzles and pressure reducing valves along with these fixtures.

- Tap aerators: Tap aerators can be effective by facilitating cleaning through increasing the pressure at which the water is delivered even at low flow rates. Installation of flow regulators can be done where the aerators cannot be installed.
- Auto control valves: Automatic shut-off valves can be used to control the flow of water for a preset time limit and with use, which is linked to the release of the lever or handle.
- Pressure reducing device: The reducers can be used to control the pressure in the water line, which will affect the discharge rate and also to maintain uniform flow at different levels. A pressure reduction device can be installed when the pressure in the line exceeds 50-60 psi. It is observed that a reduction of pressure from 80 to 65 and 50 psi can result in a reduction of water flow of 10% and 25%, respectively.

2.3.1.4 Other appliances

Water efficient washing machines

One of the most effective water saving mechanisms in clothes washers is a horizontal- axis tub or drum. These kind of machines can clean as many clothes as comparable vertical axis or 'agitator washers', but with less water. Manufacturers estimates of water saving obtainable with horizontal axis washing machines range from one-third to one-half the water and energy used by conventional, vertical axis machines. These types of machines can be used in big hotels etc.

2.3.1.5 Dual pipe plumbing

Introduction of dual pipe in the buildings for use of water with different water quality namely ground water with high hardness, municipal supply water, treated soft water and recycled water can result in optimal use of water for different applications thus saving on the high quality water. Installation of dual pipe plumbing for using recycled water / rain water can save the potable water from municipal supply or ground water. There can be two lines, one supplying fresh water for drinking, cooking and bathing etc and other for supply of recycled water for flushing, landscape irrigation, car washing, thermal conditioning etc. This results in saving of more than one-third of fresh water demand and life of existing sewerage can be improved and also promotes decentralized treatment system. This system needs space for establishment and initial investment and retrofitting.

2.3.2 Water quality

In addition to providing adequate water supply for building occupants, quality of water is also a key concern. Bureau of Indian Standards has recommended a set of parameters, which should be complied with. These are given in Table 2.2.

Table 2.2 Standards for drinking water

Parameter	Drinking water
Total hardness (as $CaCO_3$) (mg/litre)	300
Total dissolved solids (mg/litre)	500
Chlorides as chlorine (mg/litre)	250
Colour (hazen)	5
Turbidity (NTU)	5
Alkalinity (mg/l)	200
Calcium (as Ca), mg/l	75
Boron (mg/litre)	1
Sulphates (as SO_4)(mg/litre)	200
Nitrates (as NO_3) (mg/litre)	45
Conductivity at 25° C (us/cm)	-
PH	6.5 – 8.5
Anionic detergents as MBAS (mg/l)	0.2
Arsenic (mg/litre)	0.05
Iron (mg/litre)	0.3
Fluorides (mg/litre)	1
Lead (mg/litre)	0.05
Copper (mg/litre)	0.05
Zinc (mg/litre)	5
Phenolic compounds (as C_6H_5OH) (mg/l)	0.001
Cyanide (mg/l)	0.05
Chromium (mg/l)	0.05

Source: IS: 10500:1991

Further as per the CPCB, water quality standards for different classes of inland waters have been given for different applications which should be followed. (Table 2.3)

Table 2.3 Water quality standards for freshwater classification

Characteristic	Designated use class of inland waters				
	A	B	C	D	E
Dissolved oxygen (mg/l), minimum	6	5	4	4	-
pH	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5
Biochemical oxygen demand (5 days at 20°C), mg/l	2	3	3	-	-
Total coliform organisms, MPN/100 max.	50	500	5000	-	-
Colour Hazen units	10	300	300	-	-
Chlorides (as Cl), mg/l, maximum	250	-	600	-	600
Sodium absorption ratio, max	-	-	-	-	600
Boron(as B), mg/l Max					2
Sulphates (as SO_4), mg/l	400		400		1000
Nitrates (as NO), mg/l max	20		50		-

Characteristic	Designated use class of inland waters				
	A	B	C	D	E
Free ammonia (as NH_3), mg/l				1.2	-
Conductivity at 25°C microhm/cm max.				1000	2250
Arsenic (as AS), mg/l max.	0.05	0.2	0.2		-
Iron (as Fe), mg/l	0.3		50		-
Fluorides (as F), mg/l	1.5	1.5	1.5		-
Lead (as Pb), mg/l Max	0.1		0.1		
Copper (as Cu), mg/l	1.5		1.5		
Zinc (mg/l), max	1.5		1.5		
Manganese (as Mn), mg/l	0.5				
Total dissolved solids (mg/l)	500		1500		2100
Total Hardness (as $CaCO_3$), mg/l	300				
Magnesium (as Mg), mg/l	100				
Chlorides (as Cl), mg/l	250	600			600
Cyanides (as CN), mg/l	0.05	0.05	0.05		

A- Drinking water sources without conventional treatment but after disinfecting

B- Outdoor Bathing (Organised)

C- Drinking water source with conventional treatment followed by disinfecting

D- Propagation of wildlife, fisheries

E- Irrigation, industrial cooling

2.3.3 Water use reduction

To estimate the reduction in water use achieved by the building by following the mitigation measures, use following steps:

Step 1: Estimate total water demand based on the occupancy and type of building

Step 2: List various efficient fixtures and other measures

Step 3: Calculate demand reduction as compared to the BIS per capita water consumption

Under normal conditions, water consumption per person for flushing is 45 litres (9 litre/flush with 5 number of uses).

With efficient fixture (3 and 6 litre/flush), water use is 21 litre (3 litre/flush with 3 uses and 6 litre /flush with 2 uses).

Water use per person for washing with normal fixture with a flow rate of 20 litres per minute is 40 litre (assuming use for 2 minutes), while with efficient fixture (flow rate of 7.5 lpm) is 15 litres.

Table 2.4 : Estimation of water use reduction

Category	Consumption (lpcd)	Reduced Consumption (lpcd)	Reduction (%)
Human consumption	7	7	
Bathing	20	20	
Flushing	45	21	53%
Washing	40	15	62%
Miscellaneous	23	23	
Total	135	86	36%

2.3.4 Water conservation in landscape

Landscape forms an important part of the building environment. This is constituted by combination of vegetation, paving and various other landscape features such as water bodies. The vegetation includes lawns, shrubs, herbs and trees. In general, the water demand for lawns and shrubs are higher as compared to trees, which does not require or require less water after establishment. In addition, native species also require less water.

2.3.4.1 Estimation of water demand for landscape

The water requirement of the landscape can be estimated using the following equation:

$$Water\ requirement(lpd) = Canopy\ area\ (sq.m) \times Evapotranspiration\ rate\ (mpd) \times plantfactor \times {}^{1000}\!/_{irrigationefficiency}$$

1. Monthly Evapotranspiration rate (ET0): The potential evapotranspiration rate (PET) is the climate factor, refers to the amount of water required by the plant for healthy growth (depending on the climate). Evapotranspiration rate determines the rate at which plants lose water through evaporation. It is affected by humidity and temperature at a given time. These rates vary with the season and are different for different months. The data is available with the Indian Meteorological Department for different stations. The data can be procured from Additional Director General of Meteorology (Research), Shivajinagar, Pune – 411 005.
2. Canopy area is the area covered by shrubs, grass covers, and for trees it is the plan view and is assumed as 25 sq. m per tree.
3. The plant factors are categorized as
   - 1 for evergreen fruit trees, small shrubs, lush ground covers
   - 0.7 for Newly planted native plants in semiarid and arid regions; ornamental or shade trees and shrubs native to more humid areas
   - 0.4 for plants native to the areas

2.3.4.2 Measures for reducing water demand for landscape

The water consumption for the gardening depends on the type of plant species and the plant factors. As the plant factor for native species and trees is the minimum, one of the options to reduce the water demand for gardening is to include more native species and low water consuming species. Other options include use of efficient fixtures for watering, following certain best practices to minimise losses and optimise consumption.

1. Xeriscaping: Xeriscape is one of the efficient ways to reduce water consumption through creative landscaping. This involves plantation of dry plants and those plants, which can

live, once established, with little or no supplemental watering. Some of these are also drought tolerant and can survive even in areas with minimal rainfall. Annexure 1 gives the list of trees which requires minimum rainfall and can survive without water after establishment. Some of the palm trees such as Phoenix dactylifera, Yucca starlite and groundcovers such as Asparagus sprengeri, which is succulent, can be used as part of the landscape to conserve water. Other species namely, Pandanus Dwarf, which is xerophytic, and Bougainvillea which is a climber would also help in water use minimization.

2. Native vegetation : Native vegetation is original to a particular place, including trees, shrubs, and other plants. These generally require less water and less maintenance. In Annexure 2, list of species for various agro climatic regions are given .
3. Efficient irrigation equipments
    - Drip irrigation : To save water, drip irrigation is an efficient technique as it prevents loss of water due to evaporation, run – off and percolation. Further, it has a better control and facilitates uniform water distribution. However, this system cannot be used for lawns and ground covers but for non –native turf and other non-xerophytic plants.
    - Sprinkler irrigation : Sprinkler irrigation system requires a network of pipes and pumping system to maintain sufficient pressure for uniform distribution. It is best suited for areas with sandy soils which have high infiltration rates. To prevent water logging, the system should be designed in such a way that infiltration rate exceeds the application rate. Sprinklers which can produce fine sprays are more efficient as compared to those that produce large water droplets.

The efficiencies of irrigation systems differ widely. Further, to improve the efficiency certain measures can be followed, which includes use of a pressure regulator for pressures greater than 30 psi which will significantly reduce the loss during watering. Efficiencies of different kinds of irrigation equipment are given in table 2.5 below

Table 2.5 Efficiency of irrigation equipment

Irrigation system	*Efficiency*
Micro, drip	85%
Micro, spray	80%
Multiple sprinkler	75%
Sprinkler, container nursery	20%
Sprinkler, large guns	70%
Seepage	50%
Crown flood	50%

Source : TERIGRIHA

Efficient central systems

An auto irrigation system with programmed time schedule can be installed for optimal use of water. To avoid over watering particularly during the rainy season, a rain shut-off device and soil moisture sensor should be used. It is also advisable to group the plants based on their water needs to minimize water loss.

4. Fixed time schedule for watering : Time schedule for watering of plants plays an important role in saving water. Irrigation should be done during the coolest time of the day (early mornings and evenings) to avoid loss due to evaporation and wind drift. Also, the frequency of irrigation should be reduced during the winters. Regular flushing of the irrigation lines and other parts should be done. The use of combination of mitigation options can result in savings of water as indicated in Table 2.6 below. The table indicates the reduction in water that is possible by stepwise reduction in areas of high water consuming species. By reducing the lawn area by 50% and replacing it with shrubs, it is possible to achieve 32 % savings and by further introducing native species to the level of 25%, further increase in savings of 42% is achieved.

Table 2.6: Estimate of savings in water

Options	**Savings in water (%)**
100% Lawn	
50% lawn: 50% shrubs	32
50%lawn: 25%shrubs: 25%native	42
100% native	64

2.3.5 Water quality standards for irrigation

The BIS standards for irrigation is indicated in Table 2.7. It is important to conform to the prescribed standards while using water from various sources such as ground water, municipal water, rain water or treated water.

Table 2.7: Standards for irrigation

Parameter	Irrigation
Total dissolved solids (mg/litre)	2100
Chlorides as chlorine (mg/litre)	500
Boron (mg/litre)	2
Sulphates (as SO_4)(mg/litre)	1000
Conductivity at 25° C (us/cm)	2.25
pH	6.0 – 8.0

2. 4 Water conservation in process (air-conditioning)

In industrial as well as commercial applications, cooling towers are the largest consumer of potable water. Though there is continuous re circulation of water in cooling towers, still there is major loss associated with evaporation and drift losses. However, proper operations and maintenance of cooling towers can lead to significant savings in water consumption.

2. 4.1 Estimation of water demand

Water consumption in air conditioning :

$$W = 12 \times t \times C$$, where

W = annual water consumption

t = Hours of operation { 2500 h per annum}

C= Capacity of plant (in TR)

Water consumption in evaporative cooling :

In Single stage system

$$W = R \times q \times 1/1000$$, where

W = annual water consumption

R = water consumption rate (12 litre/hr)

q = air quantity (in CFM)

In Double stage

$$W = R \times q \times 1/1000$$, where

W = annual water consumption

R = water consumption rate (16 litre/hr)

q = air quantity (in CFM

2. 4.2 Mitigation options

2.4.2.1 Measures for reducing water demand in evaporative cooling process

In the conventional cooling system, water consumption is quite high. Hence, alternative systems such as evaporative cooling unit, which can result in, water saving upto 40% can be used to replace the conventional system.

Evaporative cooling unit produces effective cooling by combining the natural process of water evaporation with air. It uses right combination of controlled air flow passage across adequately designed wet surface to provide optimum efficiency.

Adopting a two stage system where the air is precooled indirectly by circulating water in the first stage and the pre cooled air is further cooled by water through direct contact in place of single stage system would result in 20% savings of water. It can be observed that although the water consumption rate is higher for 2 stage, there is a net reduction in water requirement due to the overall reduction in air quantity

2.4.3 Water quality standards for air- conditioning

Water with hardness less then 50 ppm of $CaCO_3$ is recommended for air-conditioning applications. Untreated water if used in air – conditioning system can lead to scale formation, corrosion and organic growth. Hence, it is essential to analyse the supply source for various constituents including dissolved solids.

Hardness in water is represented by calcium and magnesium salts, which may also include aluminium, iron, manganese, zinc etc. Temporary hardness is attributed to carbonates and bi-carbonates of calcium and / or magnesium expressed in parts per million (ppm) as $CaCO_3$. The permanent hardness is due to sulphates, chloride, nitrites of calcium and / or magnesium expressed in ppm as $CaCO_3$.

Temporary hardness is primarily responsible for scale formation, which results in poor heat transfer resulting in increased cost of energy for refrigeration and air conditioning. Permanent hardness (non-carbonate) is not a critical factor in water conditioning due to its solubility. In many cases, water may contain as much as 1 200 ppm of non-carbonate hardness and not deposit a calcium sulphate scale.

A chemical analysis of water sample should provide number of total dissolved solids (TDS) in parts per million (ppm) as also composition of each of the salts in parts per million. Also, water with pH less than 5 is quite acidic and corrosive to ordinary metals and needs to be treated.

(Source: National Building Code 2005)

2.5 Water use during construction

2.5.1 Parameters for water quality

Water used shall be clean and reasonably free from injurious quantities of deleterious materials such as oils, acids, alkalis, salts and microbial growth. Generally, potable water shall be used. Where water can be shown to contain any sugar or an excess of acid, alkali or salt, that water should not be used. As a guide, the following concentrations may be taken to represent the maximum permissible limits of deleterious materials in water.

1. Limits of acidity: To neutralize 200 ml sample of water, it should not require more than 2 ml of 0.1 N caustic soda solution.
2. Limits of Alkalinities: To neutralize 200 ml sample of water it should not require more than 0.1 ml of 0.1 N hydrochloric acid.
3. Percentage of solids should not exceed:

   Organic . . . . . 200 ppm (0.02%)
   Inorganic . . . . . 3000 ppm (0.30%)
   Sulphates . . . . . 500 ppm (0.05%)
   Alkali chlorides. . . . . 1000 ppm (0.1%)

During the construction process, it is necessary to use pure drinking water to prepare lightweight concrete. (Refer table 2.2, standards for drinking water). In the absence of pure water, the sea water may be used with hydraulic lime and cement. It helps in preventing too quick drying of the mortar. However, it is not advisable to use sea water in making pure lime mortar or surkhi mortar because it will lead to efflorescence.

Source : CPWD manual

2.5.2 Measures for reducing water demand during construction

To avoid wastage of curing water, following guidelines are to be followed:

1. Curing water should be sprayed on concrete structures; free flow of water should not be allowed for curing.
2. After liberal curing on the first day, all concrete structures should be painted with curing chemical to save water. This will stop daily water curing hence save water.
3. Concrete structures should be covered with thick cloth/gunny bags and then water should be sprayed on them. This would avoid water rebound and will ensure sustained and complete curing.
4. Ponds should be made using cement and sand mortar to avoid water flowing away from the flat surface while curing.
5. Water ponding should be done on all sunken slabs, this would also highlight the importance of having an impervious formwork.

Source: TERI GRIHA

2.6 Waste water generation

2.6.1 Introduction

Every building generates wastewater amounting to almost 80% of total water consumed. The major source of wastewater includes the grey water from kitchens, bathrooms and black water from toilets. To maintain the surrounding environment and to reduce the demand on potable water by providing secondary and tertiary treated water, it is important for every new construction to ensure treatment of the wastewater generated from the building through centralized or decentralized systems.

2.6.2 Issues of concern

There is lack of proper drainage systems in case of new developments in certain cities. In some of the cities, the existing sewerage and the centralized sewerage treatment plant is not adequate to cater to the additional load of the new development.

2.6.3 Estimation of waste water generated

Waste water generated = 80% of water used (For water demand, refer to table 2.1)

2.6.4 Mitigation options

2.6.4.1 Measures for reducing waste water generation

Waste water generated can be reduced through water use reduction by using efficient plumbing fixtures. {Refer section 2.3.1.3 to see the description for efficient plumbing fixtures.}

2.6.4.2 Treatment techniques

Waste water which includes both black water from toilets and grey water from bathrooms and kitchens, washings can be suitably treated and reused for non potable applications such as irrigation, flushing etc. Different treatment techniques can be adopted depending on the land availability, quantity and characteristics of the wastewater. Treatment plants normally used for building sewage are based on biological processes. In addition, artificial wetlands or reed bed systems for waste water treatment based on the use of deep – rooted plants can also be used at decentralized level.

1. Aerobic treatment systems: These processes are based on the biological conversion of organic contaminants in the wastewater in the presence of oxygen; carbon dioxide is given off and sludge produced leaving the water relatively clean. The wastewater is generally pretreated by passing it through a settling chamber before aeration; the system could be based on either suspended growth or attached growth.

   Advantages:
   - Complete treatment of the wastewater
   - Used as the final polishing step before discharge of wastewater

   Disadvantages:
   - High Land requirement
   - High Energy required for operation of the treatment plant



Figure 2.2 : Aerobic design

2. Anaerobic treatment systems: These systems are also based on the degradation of pollutants in the wastewater by microorganisms but reactions occur in the absence of oxygen. Conventional digesters such as sludge and anaerobic CSTR (continuous stirred tank reactors) have been used in India for many decades in sewage treatment plants for stabilizing activated sludge and sewage solids. Presently, high rate biomethanation systems based on the concept of sludge immobilization techniques (UASB, fixed films, etc.) is also being considered. In the case of upflow anaerobic sludge blanket (UASB) reactors, the treatment efficiencies are high even for a very short retention time. This is being used for treatment of domestic wastewater for small towns. An advantage with this type of reactor is the generation of useful by products – high calorific value fuel biogas and digested sludge that can be used as manure.

Advantages

- Lower energy requirement combined with the production of biogas
- Low nutrient requirement
- High degree of waste stabilization
- Handling high organic loading rates
- Lower production of excess sludge, which in addition, is well-stabilized and therefore easier to dispose.
- Easier preservation of well-adapted sludge which can be kept unfed for a period of more than one year without any deterioration.

Disadvantages

- Requires skilled operation
- Capital cost is high

3. Root zone treatment system: The system is suitable for the treatment of wastewater from various sources containing biodegradable compounds. The process was developed in 1970 by Dr Reinhold Kickuth of Germany. The system is most suited to decentralized wastewater treatment in small colonies, hotels, etc. It is based on the principle of attached growth biological reactors similar to conventional trickling filters with a combination of aerobic and anaerobic zones. The contaminants present in the wastewater are treated as they seep through the root-zone of the plants by a combination of plants, soil, bacteria and hydraulic flow systems resulting in physical, chemical, and microbiological processes. Oxygen present in the zones facilitates the degradation of wastewater. A wide variety of micro organisms present in the root-zone of the plants result in efficient removal. There is efficient reduction of pathogens also by percolation through the bed material.

Advantages

- Low capital costs
- Low operating and maintenance costs
- No chemicals required for the treatment process
- Absence of byproducts requiring treatment
- Technical expertise for the operation not required
- Effective treatment resulting in tertiary standards

Disadvantages:

- High land requirement

2.6.2.4 DEWATS

DEWATS stands for "Decentralized Wastewater Treatment Systems". DEWATS system consists of four basic technical treatment modules, namely,

1. Primary treatment: sedimentation and floatation
2. Secondary anaerobic treatment in fixed-bed reactors: baffled upstream reactors or anaerobic filters
3. Tertiary aerobic treatment in sub-surface flow filters
4. Tertiary aerobic treatment in polishing ponds

Advantages

1. Low maintenance without technical energy inputs
2. Affordable prices due to locally available materials
3. Flexible treatment capacity ranging between 1- 1000 m3 per day.
4. Reliable, long lasting and tolerant towards inflow fluctuation.

DEWATS applications are designed and dimensioned in such a way that treated water meets requirements stipulated in environmental laws and regulations.

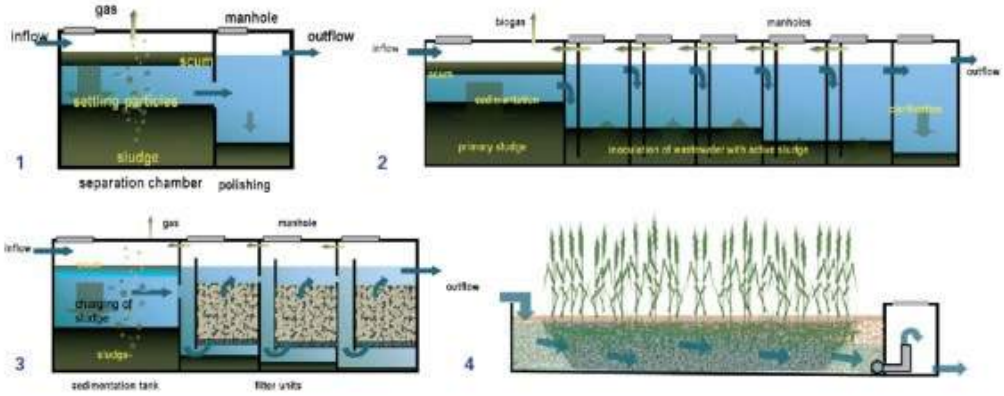


Figure 2. 3 Dewats modules for wastewater treatment:

1. Settler 2. Anaerobic Baffled Reactor 3. Anaerobic Filter 4. Planted Gravel Filter

Source: BORDA-net.org

2.6.2.5 Soil Biotechnology (SBT)

Soil Biotechnology (SBT) process for organic waste (solid and liquid) processing developed at Chemical Engineering Department IIT Bombay has the necessary features of green technology that are cost effective, energy efficient and is available to the users at the scales required. The intellectual property rights of the technology are covered under Indian and US Patent.

The science, technology and performance features of SBT are outlined below.

Process Description & Design :

A typical SBT plant consists of impermeable floor (PCC or HDPE membrane depending upon the terrain) & containment with suitable water proofing (UCR/RCC walls), raw water tank, filtered water tanks, bioreactor containing suitable media, culture and bio indicator plants required for the wastewater renovation.

The bioreactor is constructed over the impervious floor. It consists of soil bays containing media, which is cultured and planted with select bio-indicators. Plant operation is set to achieve the required level of purification. Plant operation involves pumping the raw water into the soil bays, sprinkling specified additives and maintaining the bio-indicators and all functions s prescribed and demonstrated during training. The renovated water is to be pumped via suitable distribution system for gardening.

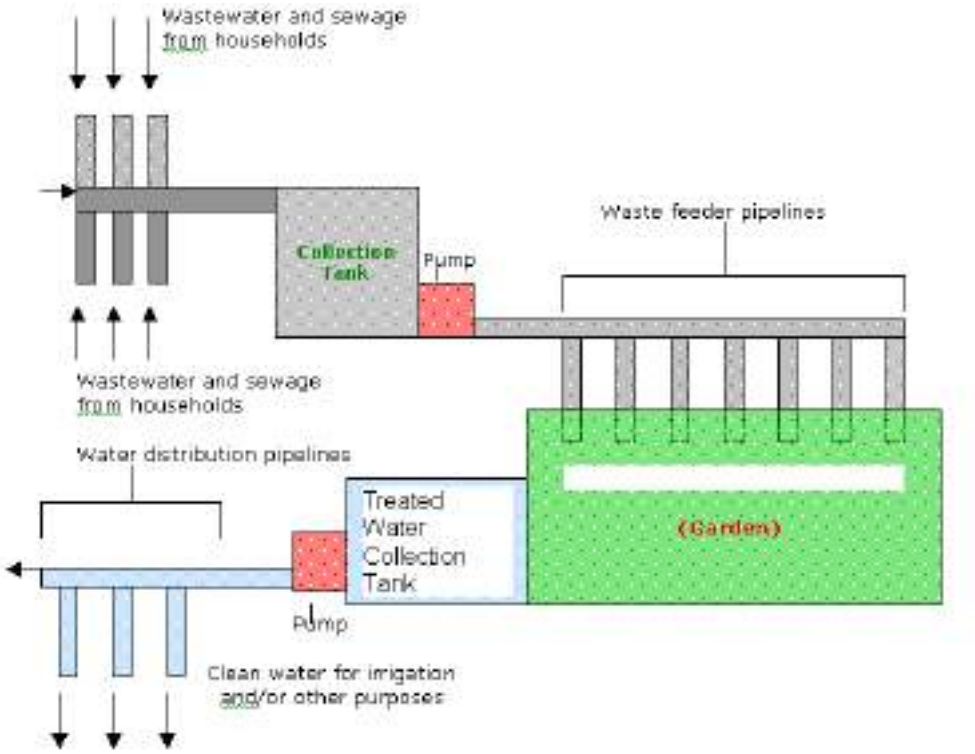


Figure 2.4 Flow Diagram for Liquid Waste (Sewage/Effluent) treatment by SBT

2.6.2.6 INDION Membrane Bio - Reactor

INDION Membrane Bio – Reactor is among the latest technologies in bio-chemical treatment. It is designed to produce high quality treated water from wastewater with highest possible contaminant reduction without using any chemicals.

The characteristics of the INDION MBR process is the use of revolutionary submerged micro and ultra filtration membranes in the biological process water tank, to produce high quality permeate from domestic sewage, primary and secondary wastewater, cooling tower blow down etc. The submerged membranes used in the biological process water tank totally removes suspended sludge from the activated sludge liquid and long term stable MBR operation is achieved with high permeate flow rates.

MBR can be applied in housing complexes, townships, hotels, golf and country clubs, industrial estates and existing plant upgradation.

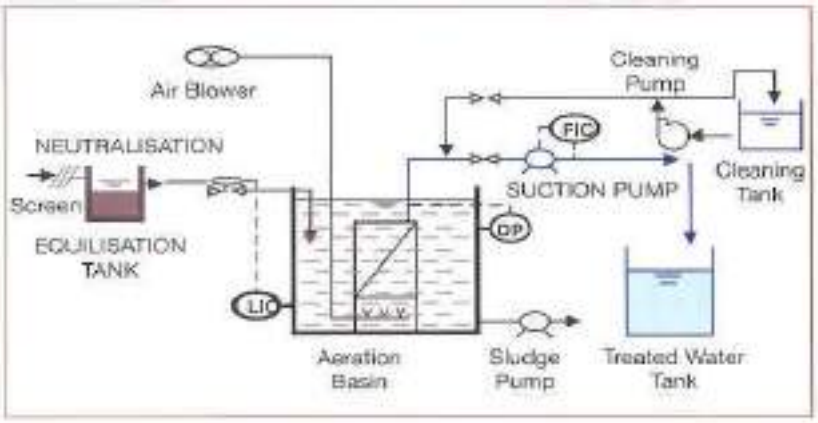


Figure 2.5: Typical treatment scheme

Advantages

1. Low energy consumption (0.30 kwh/m^3) for filtration.
2. Upto 99.9999% removal of total coliform
3. Compact, requires ½ to 1/3 space over a conventional system.
4. Modular in construction and design

2. 6.2.7 INDION Package sewerage treatment plant

It is unique combination of lamella plate clarification and results in a ready to operate, prefabricated solution of outstanding performance and efficiency.

Treatment process

Primary settlement → Aerobic treatment → Final settlement

Primary settlement: Sewage initially enters the primary settlement tank. The tank incorporates lamella parallel plates, which aid in reducing the suspended solids by 75% and the BOD by 25%. This zone is relatively maintenance free and contains no moving mechanical or electrical devices.

Aerobic treatment: The effluent then enters the aerator bio-zone, which is a combined fixed film reactor, and active aeration system is mounted on a horizontal shaft. The aerator provides a solid surface area for microorganisms to attach themselves; these then feed on the organic matter present in the effluent. The rotation of the drum creates an aeration of the liquid. The bio-zone is self-cleansing and does not require extraneous pumping or sludge return.

Final Settlement: The treated effluent then moves to a settlement area. This area contains a lamella parallel plate

assembly for settling finer particles. The submersible pump removes sludge to a sludge storage compartment on a regular time basis.





Figure 2.6 : Packaged Treatment Plant

2.6..2.8 Akar Wastewater treatment plants

AKAR range of ADBR (Akar Dynamic Bio-Reactor System) is a dynamic bio-reactor waste water treatment packaged plants of different capacities from 10 KLD to 1000 KLD. ADBR systems works fast that the process reaction time reduces by more than 35%. This helps in saving space by more than 35% and saving in energy consumption by almost 35%.

Advantages:

1. No time is needed in erecting and commissioning the system and this system is ready to use.
2. These systems are mounted on skids therefore easily transportable and are compact. Hence it requires no excavation, no major concrete work, no major onsite fabrication and pipe / fittings.

2.6.3 Standards for disposal of waste water

Maximum permissible limits (mg/litre) for effluent discharges are given in Table 2.8.

Table 2. 8 Permissible limits for effluent disposal

Parameter	Into inland surface waters Indian Standards: 2490 (1974)	Into public sewers Indian Standards: 3306 (1974)	On land for irrigation Indian Standards: 3307 (1974)
pH	5.5.-9.0	5.5-9.0	5.5-9.0
Biological oxygen demand (for five days at 20°C)	30	350	100
Chemical oxygen demand	250	-	-

Parameter	Into inland surface waters Indian Standards: 2490 (1974)	Into public sewers Indian Standards: 3306 (1974)	On land for irrigation Indian Standards: 3307 (1974)
Suspended solids	100	600	200
Total dissolved solids (inorganic)	2100	2100	2100
Temperature (°C)	40	45	-
Oil and grease	10	20	10
Phenolic compounds	1	5	-
Cyanides	0.2	2	0.2
Sulphides	2	-	-
Fluorides	2	15	-
Total residual chlorine	1	-	-
Pesticides	-	-	-
Arsenic	0.2	0.2	0.2
Cadmium	2	1	-
Chromium (hexavalent)	0.1	2.0	-
Copper	3	3	-
Lead	0.1	1.0	-
Mercury	0.01	0.01	-
Nickel	3	3	-
Selenium	0.05	0.05	-
Zinc	5	15	-
Chlorides	1000	1000	600
Boron	2	2	2
Sulphates	1000	1000	1000
Sodium (9%)	-	60	60
Amoniacal nitrogen	50	50	-
Radioactive materials	10^{-7}	10^{-7}	10^{-8}
Alpha emitters (milli curie/millitre)	10^{-6}	10^{-6}	10^{-7}
Beta emitters (micro curie/millitre)			

Source : CPCB, 1998, Pollution Control Acts, Rules, and Notifications issued thereunder. Volume I, pp. 311-312. New Delhi: Central Pollution Control Board, MoEF. 501 pp.

2.7 Construction wastewater management

Wastewater generated from the site during the construction contains suspended materials, spillage and washings from the various areas which can be hazardous and should not be mixed with the sewage water or allowed to percolate into the ground. A separate drainage should be provided for the construction wastewater and collected in a separate basin. The water should be discharged into the sewage drain after pre treatment including filtration and removal of contaminants to the standards prescribed for disposal.

2.8 Sanitation facilities for construction workers

Sewage generated from the areas occupied by the construction labourers have to be directed into the existing sewage drain of the area. In case of non availability of the sewer system, an onsite decentralized treatment system has to be provided.

2.9 Rain water harvesting

2.9.1 Introduction

With burgeoning population and rising demands the pressure on the existing water resources has grown many folds. Large-scale construction and urban development projects catering to the need of growing urbanization lead to land use modification increasing exploitation of scarce water resources and subsequent increase in generation of waste water discharges and surface runoff. Rainwater harvesting is the age-old concept, which holds immense potential in the current times in controlling runoff and resulting water logging problems besides assuring an alternative source of water and a supplement to existing natural resources in a wide variety of circumstances.

2.9.2 Issues of concern

Despite having some clear advantages over other sources, rainwater use has frequently been rejected on the grounds of its limited capacity or due to water quality concerns. This is unfortunate as in many cases some simple upgrading and the integrated use of rainwater collection with other technologies is all that is required to obtain a cost effective and reliable water supply solution. (Gould, 1999)

Predictions regarding global warming could have a major effect in significantly increasing water demand in many cities. Increased climatic variability and the greater frequencies of droughts and floods possible in many areas will also make the role of rainwater harvesting systems even more important as sources of supplementary, back-up, or emergency water supply. This will particularly be the case in areas where increasing pressure is put on existing water resources. (Gould, 1999)
At the same time, while rainwater harvesting can be done in almost all environment and conditions, it is important that the concept is not followed blindly but based on site-specific scientific assessment. The amount of rainfall available varies from region to region. There are several methods by which rainwater can be stored, used and conserved. Each system depends on the amount of precipitation, the period in which the rainfall occurs in a year and the physical infrastructure, for example the space available to store the water, etc. Two major systems that are ideal for urban and semi-urban developed areas are artificial ground water recharge, and roof top rainwater harvesting (NBC, 2005).

The parameters to be considered for determining the feasibility and design of an appropriate rainwater harvesting system have been discussed in detail in the following sections.

2.9.3 Measures to be taken

2.9.3.1 At the planning stage

While planning for rainwater harvesting, site specific assessment needs to be undertaken to ensure the techno- social and economic feasibility of rainwater harvesting system. This is necessary both for the type of structures planned and the proposed use of the harvested rainwater. The need for rainwater harvesting in an area may be broadly determined by:

1. The existing regulations and notifications (such as building byelaws) to check whether rainwater harvesting is mandatory for the area.
2. This must be further analysed in the light of site specific needs as well, such as
    - Available sources and their sustainability both in terms of surface water and ground water sources.
    - Existing or perceived water logging problem due to low lying area and related issue of water borne diseases.
    - Depleting/over-exploited groundwater aquifer or areas having high rate of decline of groundwater table
    - Poor quality groundwater/threat from salt intrusion in case of coastal/island states
    - Problems of accessibility in hilly terrains. Even in case of sufficient rainfall, most hill town face water shortages due to lack of provisions for capturing the runoff.

BOX 2.1: When not to do RWH

Using storage (Surface/ subsurface) structures

- If the gap between rainy days is too large, it may be uneconomical to build storage to cater to the dry period
- Open surface storage structures may not be feasible in case of high rate of evaporation

Using artificial recharge structures

In general, CGWB norm suggests not to do artificial recharge if water table is less than 8 m. However one must also look at trend & future development possibilities, which may exert pressure on ground water resources and plan for recharge accordingly. In any case water table must not be less than 4 m. to avoid any water logging and damage to structure. (Refer State Ground Water Agency and Central Ground Water Board Data)

Artificial recharge is not recommended for aquifers with TDS levels higher than 4000 mg/L or high levels of chemical components such as Nitrate, Fluoride, Arsenic. (Refer State Ground Water Agency and Central Ground Water Board Data). Existence of potential contamination environments such as landfill sites, industries, cemeteries in vicinity also need to be considered.

2.9.3.2 At implementation stage

Once the need for rainwater harvesting is established, implementation of rainwater harvesting systems should be carried out as follows:

1. Estimate total annual rainwater harvesting potential using the following formula.

Total annual RWH potential (cubic metre) = Rainfall (m) x Area of catchment (square metre) x Runoff coefficient x filter efficiency

Where,

Rainfall (m) : Annual average rainfall data for at least 10 years is used here. This dataset is available from IMD & should be taken for the nearest station with comparable conditions. Annual average rainfall for some of the cities in India are given below:

Delhi = 611.0 mm = 0.61 m
Mumbai = 2,170 mm= 2.17 m
Chennai = 1200 mm =1.2 m
Cochin = 3099 mm =3 m
Darjeeling = 3200 mm = 3.2 m

Area of catchment : Roof Area (sq.m)= Width x Length of Roof. In a sloping roof, only the section of the roof to be used for collection is measured.

Run-Off coefficient : Runoff depends upon the area and type of the catchment over which it falls as well as surface features. All calculations relating to the performance of rainwater catchment systems involve the use of runoff coefficient to account for losses due to spillage, leakage, infiltration, catchment surface wetting and evaporation, which will all contribute to reducing the amount of runoff. (Runoff coefficient for any catchment is the ratio of the volume of water that runs off a surface to the volume of rainfall that falls on the surface). Run off coefficients for some surfaces is given in table 2.8

Table 2.9 Runoff coefficients for different surfaces

Surface type	Runoff coefficient
Roofs conventional	0.70 to 0.80
Roofs inclined	0.85 to 0.95
Concrete/Kota Paving	0.60 to 0.70
Gravel	0.50 to 0.60
Brick Paving	0.75
Vegetation	
1%–3%	0.20
3%–10%	0.15
> 10% (more the vegetation cover – less the runoff coefficient)	0.10
Turf slopes	
0%–1%	0.25
1%–3%	0.35
3%–10%	0.40

Surface type	Runoff coefficient
> 10%	0.45

Filter efficiency : The efficiency value shall depend on the type of filter used. There are many filtration systems that can be used. Example of some filter systems are given in section on: "measures to ensure water quality".

A reference table to estimate rainwater availability for a given roof top area and rainfall is presented below. {Refer Annexure 2.3}

2. Prepare rainwater harvesting site plan with defined catchments and identify location for siting the rainwater harvesting structures.

This would include identification of abandoned bore wells/ dug wells/ ponds, which can be used for the purpose after studying the feasibility. For eg: Abandoned borewells / dugwells may be used as artificial recharge structures after testing the intake rate. Also see box 2.2 .

Box 2.2: Using existing site features for rainwater harvesting

Existing ponds/ tanks in the development sites hold immense potential for harvesting surface run off. Traditionally these have been common water storage structures for meeting demand for irrigation and cattle. Most ponds/ tanks may have their own catchments, which can serve to arrest surface runoff from the new development if appropriate measures are taken to conserve the natural catchment. These ponds in the modern context can be used for fire fighting/ horticulture by integrating them in the landscaping.

Alternatively the existing ponds/ tanks, which are often damaged or silted, can be modified to serve as recharge structures

While planning for ground water recharge structures in large scale development projects, the following tools may be used to identify appropriate location for the structures:

Satellite imagery : Satellite data of ground water maps is available from various national agencies such as Space Application Centre, Ahmedabad and NGRI, Hyderabad & concerned State Departments.

Ultrasound seismo-resisitivity sub soil investigation method : This technique is used to determine:

- Location and profile of each aquifer (Commercial availability, time & cost)
- TDS Concentrations
- Hardness characteristics
- Other chemical parameters that are critical like Nitrate, Fluoride, Arsenic, etc.

3. Design storage/recharge structures : Rainfall pattern and quantity is the prime determinant of the type of structures to be constructed for harvesting rainwater in a site. The number of annual rainy days also influences the need and design for rainwater harvesting. The fewer the annual rainy days or longer the dry period, the more the need for

rainwater collection in a region. However, if the dry period is too long, big storage tanks would be needed to store rainwater. Hence in such regions, it is more feasible to use rainwater to recharge groundwater aquifers rather than for storage. The details of the structures are given in Sections 2.9.3.3 and 2.9.3.4.

4. Plan for overflow and drainage and use of the harvested rainwater
5. Vetting of Designs by authorities concerned (if specified in the existing regulation) or by hydrologist/hydrogeologist to ensure aquifer safety and civil engineer/architect to ensure structural safety.
6. Construction to be done by contractors trained and approved by CGWB as per designs specified by CGWB of India.

2.9.2.3 Artificial recharge structures

In urban areas with the rainfall limited during the monsoon period (usually from 15-90 days) rooftop rainwater cannot be stored and used as mentioned above and is best used for recharging the ground water (NBC,2005). Artificial recharge to ground water aims at augmentation of ground water reservoir by modifying the natural movement of surface water utilizing suitable civil construction techniques. The main objectives achieved may be:

- Enhancement of the sustainable yield in areas where there is over-development and depletion of the aquifers.
- Conservation and storage of excess surface water in the aquifers
- Improve the quality of existing ground water through dilution.
- Remove bacteriological and suspended impurities during the surface water transition within the subsoil.
- Maintain the natural balance of the ground water and its usage as the rainwater is a renewable supply source. A well managed and controlled tapping of the aquifers will provide constant, dependable and safe water supply. (NBC, 2005)

The artificial recharge of ground water is normally recommended in areas where:

- Ground water levels show a declining trend
- Substantial amount of aquifer has already been desaturated.
- Availability of ground water is inadequate in lean months.
- Salinity ingress is taking place.
- Large scale development is planned and the surface water availability is limited.

Basic Requirement for Artificial Recharge :

In planning and designing the ground water recharge structures following points should be taken into consideration:

1. Annual rainfall (for estimating approx. rainwater recharge per year, as demonstrated in section above).
2. Peak intensity and duration of each storm : For design of recharge structure, hourly runoff i.e. maximum hourly intensity occurring maximum number of time in 5- 10 years is used. (25-35 mm/ hour for Delhi/ Chandigarh/ Bhopal; 30-45 mm/ hr for Bombay/ Chennai/ Kolkatta)
   (This dataset is available from IMD & should be taken for the nearest station with comparable conditions.)
3. Type of soil and subsoil conditions and their permeability factor : Infiltration rates of soil and hydraulic conductivities of water transmission are required to be considered while constructing recharge systems. Infiltration capacity of different soils types are carried out by State agriculture departments and/ or land use survey organisations. This data/ information together with maps showing infiltration rates is usually available in their department reports published periodically and are available with district agriculture officer. At the district level, this information is available in the departmental reports of the Central and State ground water boards. Normally hydraulic conductivities (K- values) of various soils in m/ day , which can serve the purpose of assessing the final infiltration rates of soils are given in table 2.10. These can be used in the absence of measured values of soils under recharge. K-values however, must be measured for a particular site for efficient results.

Table 2.10 Hydraulic conductivities of soil

S no.	Soils	K- values (m/ day)
1	Clay surface	0.01-0.2
2	Deep clay layer	10^{-8}- 10^{-2}
3	Loam	0.1-10
4	Fine sand	1-5
5	Medium sand	5-20
6	Coarse sand	20-100
7	Gravel	100-1000
8	Sand and gravel	5-100
9	Clay, sand & gravel	0.001-0.1

Source: MoWR, GoI, 2004, pg. 15, 84

The infiltration rates for various types of surface soils which facilitate entry into vadose zone are given in table 2.11.

Table 2.11 Infiltration Rate of Different Texture (CM\Hour)

Coarse sand	:	2.00 – 2.50
Lateritic red sandy soil	:	1.50-2.00
Fine sand	:	1.30-2.00
Fine sandy loam	:	1.20
Silty loam	:	1.00
Clay loam	:	0.80
Clay	:	0.50

Table 2.12 Specific Yield of Different Formation

		Yield (%)
Sand	:	10-30
Gravelly Sand (coarse sand)	:	15-30
Sand and Gravel	:	15-25
Sand stone coarse-grained	:	10-15
Sand stone fine–grained	:	5-15
Thick plastic clay	:	3-5
Weathered rock	:	2-5
Clay	:	1-10
Fractured and jointed rock	:	0.50-5

Table 2.13 Typical Porosities of soil

Soil Texture	**Porosity**
Sandstone	0.19
Sandy loam sub soil	0.36
Sandy loam plough layer	0.42
Clay loam subsoil	0.44
Recently ploughed clay loam	0.58

4. Hydrogeological studies : Detailed knowledge of geological and hydrological features of the area is necessary for adequately selecting the site and the type of recharge structure. In particular, the features, parameters and data to be considered are: geological boundaries; hydraulic boundaries; inflow and outflow of waters; storage capacity; porosity; hydraulic conductivity; transmissivity; natural discharge of springs; water resources available for recharge; natural recharge; water balance; lithology; depth of the aquifer; and tectonic boundaries. The aquifers best suited for artificial recharge are those aquifers which absorb large quantities of water and do not release them too quickly. Theoretically this will imply that the vertical hydraulic conductivity is high, while the horizontal hydraulic conductivity is moderate. These two conditions are not often encountered in nature.

(Source: Guide on Artificial recharge to ground water, Ministry of Water Resources, New Delhi 2000)

Data of existing borewells should also be collected to determine the intake capacity of the recharge wells, which is generally 70% to 80% of the yield of wells in the specified area. (Refer State Ground Water Agency and Central Ground Water Board Data)

5. Location of recharge structures : The basic purpose of artificial recharge of ground water is to restore supplies from aquifers depleted due to excessive ground water development. Some of the structures generally used are:
   - Recharge pits
   - Recharge trenches
   - Recharge shaft
   - Trench with recharge well
   - Shaft with recharge well
   - Recharge through abandoned hand pumps
   - Recharge through abandoned tube well
   - Recharge well
   - Injection well
   - Percolation tank
   - Check dam
   - Gabion bund
   - Sub-surface dyke
   - Roof top rain water harvesting
   - Recharge wells/ tidal regulators to arrest salinity ingress in coastal aquifers

Design details of a few structures are described below.

- Trench with recharge well

For recharging the shallow as well as deeper aquifers, lateral trench of 1.5 to 3 m wide & 10 to 30 m long depending upon availability of water with one or more bore wells may be constructed. The lateral trench is back filled with boulders, gravels and coarse sand.

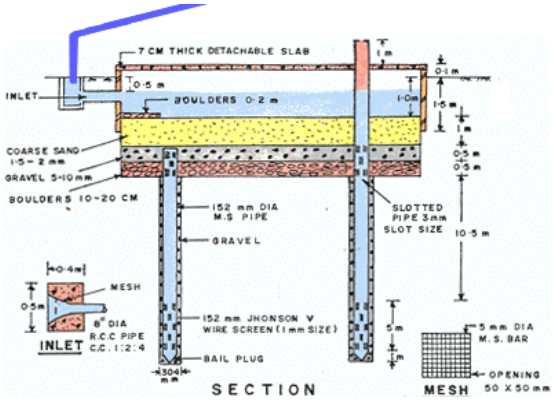




Figure 2.7 Recharge well

Source: Central Ground Water Board

- Shaft with recharge well

In case of aquifer depths greater than 20m or more, shaft of 2 to 5 m diameter and 3 to 5 m deep may be constructed depending upon availability of runoff. Inside the shaft a recharge well of 100 to 300 mm diameter is constructed for recharging the available water to the deeper aquifer. At the bottom of the shaft a filter media is provided to avoid choking of the recharge well.

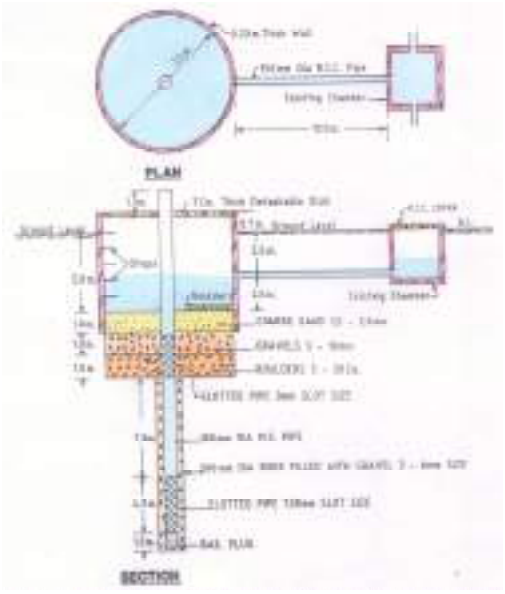


Figure 2.8 Recharge well shaft

Source: Central Ground Water Board

- Abandoned tubewell

Abandoned tubewell may be used for recharging the shallow / deep aquifers. These tube wells should be redeveloped before use as recharge structure. Water should pass through filter media before diverting it into recharge tube well.



Figure 2.9 Abandoned tubewell

Source: Central Ground Water Board

- Checkdams

Check dams are constructed across small streams having gentle slopes and are feasible both in hard rock and in alluvial formations. The site selected for check dam should have sufficient thickness of permeable bed or weathered formation to facilitate recharge of stored water within short spell of time. The water stored in these structures is mostly confined to stream course. The height is kept at about 1 to 5 meters



Figure 2.10 : Check dams

Source: Central Ground Water Board

2.9.3.4 Roof top rainwater harvesting using (surface/ subsurface) Storage structures

In areas having rainfall of considerable intensity, spread over a large period in a year with short dry spells rainwater harvesting from roof tops is an ideal option for augmenting water supply. Rainwater is essentially bacteriologically pure, free from organic matter and soft in nature and hence can be an ideal solution for areas where there is inadequate ground water supply and surface water resources are either lacking or insignificant. Himalayan region, North-eastern states, Andaman Nicobar, Lakshadweep islands and southern parts of Kerala and Tamil Nadu are the regions where rainwater can be usefully harvested and stored in suitable storage tanks (surface / sub surface). The water is collected through roof gutters and down take pipes.
In case of storage structures, the size of the tanks should ideally be enough to supply sufficient water during the dry (non rainy) period. Factors considered in design include demand, duration of dry spell, catchment area available and rainfall. Assuming a full tank at the beginning of the dry season (and knowing the average length of the dry season and average water use) the volume of the tank can be calculated by the following formula:

$$V = (T \times N \times Q) + Et$$

Where,
V= volume of the tank (litres)
T= length of the dry season (days)
N= number of people using the tank

Q= consumption per capita per day (litres)
Et= evaporation loss during dry period (which may be ignored in case of closed storage tanks)
(MoRD, GoI, 2004)

The five main site conditions to be assessed in case of (surface/ subsurface) storage structures are:

- Availability of suitable catchments (Rooftops are usually recommended as against surface catchments in this case as quality control measures can be relatively easier to apply and monitor).
- Foundation characteristics of soil near the house
- Location of trees
- Estimated runoff to be captured per unit of the catchment
- Availability and location of construction material (MoRD, GoI, 2004)

Measures to ensure water quality

Rainwater is generally devoid of any impurities and can ensure good quality water if certain precautions are taken. These include :

- Catchments such as roofs should be accessible for regular cleaning and ensuring no dead animals etc are present on the surface.
- The roof should be made of non- toxic material, have smooth, hard and dense surface which is less likely to be damaged allowing release of material into the water. Roof painting is no advisable since most paints contain toxic substances and may peel off.
- All gutter ends must be fitted with a wire mesh screen and a first flush device must be installed. Most of the debris carried by the water from the rooftop like leaves, plastic bags and paper pieces can be arrested by the mesh at the terrace outlet and contamination can be prevented to a large extent by ensuring that the runoff from the first 10-20 minutes of rainfall is flushed off. Remaining contaminants like silt and blow dirt can be removed by installing appropriate filters. (Refer Annexure 2.3 on details of filtration systems")
- No sewage or wastewater should be admitted into the system.
- No wastewater from areas likely to have oil, grease, or other pollutants should be connected to the system. For runoff from parking lots and roads, grease filters etc may be necessary to prevent risk of contamination from chemical spillage.

Some specific measures with respect to artificial recharge structures and storage tanks are listed below :

In case of artificial recharge structures,

- Each structure/ well should have an inlet chamber with a silt trap to prevent any silt from finding its way into the sub soil water.- The wells should be terminated at least 5 mt above the natural static sub soil water at its highest level so that the incoming flow passes through the natural ground condition and prevents contamination hazards. (NBC, 2005)
- It needs to be ensured that no recharge structure or a well is used for drawing water for any purpose.

In case of surface / subsurface storage tanks,

- The location of the tank should be such that it is not exposed to any hazard of water contamination from any other sources.
- Appropriate measures for disinfection and maintaining quality of the stored water such as chlorination must be used. In case of chlorination, water shall be chlorinated maintaining a residual chlorine of approximately 1mg/l.
- The tank must have an overflow leading to a natural water course or to any additional tank or ground water recharge structure. (Also see box 4)
- At the end of the dry season just before the onset of the rains, the storage tank should be flushed of all sediments and debris (the tank should be re-filled afterwards with a few centimetres of clean water to prevent cracking). Ensure timely service (before the first rains are due) of all the tank features, including replacement of all worn screens etc. It is also advisable to monitor rainwater quality periodically to check presence of air pollutants, which may be addressed specifically if occurring at frequent intervals.

Box4: Integrating storage with ground water recharge in Germany

In Germany there is currently a growing interest in the promotion of rainwater collection particularly at local government level. Due to serious industrial air pollution and strict regulations regarding drinking water standards, household rainwater supplies are limited to non-potable uses such as toilet flushing, clothes washing, and garden watering. In addition to reducing overall domestic water demand, benefits from rainwater utilization include flood control and reduced stormwater drainage capacity requirements. When used in conjunction with a seepage well to return any overflow to the ground, the systems also enhance groundwater recharge. Most storage tanks are constructed underground and recent designs incorporate a porous ring at the top of the tank so when it is more than half full, water seeps back into the ground. The main advantage of designing rainwater collection systems in this way or in conjunction with seepage wells is that many German cities charge householders an annual rainwater drainage fee, which is waived if rainwater runoff is retained or returned to the ground allowing significant savings.

Source : Source: Gauld, 1999

Annexure 2.1 Drought Resistant Plants

Tree species	Common Name	Annual rainfall required		Drought resistance	
		Minimum	Maximum	During Planting	Mature Tree
Prosopis cineraria	Khejri	75	800	8	10
Capparis deciduas	Kiari , Caperbrush	100	1500	9	10
Tamarix aphylla		100	500	8	10
Acacia tortillas		100	1000	10	10
Zizyphus nummularia	Jungli Ber	125	2225	6	10
Prosopis juliflora	Kikar	150	750	10	10
Tecomella undulata	Rugtora/Wavy leafed Tufmella	150	500	8	10
Colophospermum mopane		150	800	8	10
Salvadora oleoides		180	1000	8	10
Acacia aneura		200	500	9	10
Parkinsonia aculeate		200	1000	8	10
Dichrostachys cineraria		200	700	8	10
Acacia holosericea		200	1500	8	9
Borassus flabellifera	Tar	?20	1000	6	8
Grewia tenax	Falsa	200	1000	5	7
Commiphora wightii	Guggal	225	500	7	10
Acacia seyal		250	1000	7	9
Eucalyptus camaldulensis	Eucalyptus	250	2000	7	8
Hardwickia binnata		250	1500	7	8
Pithecelobium dulce	Jungle Jalebi	?250	1250	6	7
Celtis australis		250	800	5	6
Acacia albida		300	1800	8	10
Albizia lebbek	Shirish	300	2500	8	8
Acacia nilotica	Babul	350	2000	8	9
Acacia ferruginea		350	750	7	9
Casuarina equisetifolia	Jhar	350	5000	7	8
Leucaena leucocephala	Subabul	350	2000	5	6
Melea azedirach		350	2000	6	7
Sesbania grandiflora		350	1200	5	6
Tamarindus indica	Imli	350	1500	5	8
Wrightia Tinctoria		400	800	8	10
Morus indica/alba	Mulberry	400	2000	6	10
Ailanthus excelsa		400	850	7	8
Dalbergia sissoo	Sheesham	400	4500	6	8
Anona squamosa	Custard Apple	400	2000	7	9
Emblica officinalis	Amla	400	2500	6	8
Anogeissus pendula		425	875	7	8
Acacia leucophaloea		450	1500	6	9
Azadirachta indica	Neem	450	1150	7	8
Diospyros melanoxylon	Tendu	450	1500	7	8
Ougeinia oojeinensis		450	1750	5	6
Commiphora caudata		500	850	7	10
Bauhinia variegata	Kachnar	500	2750	7	9
Eucalyptus tereticornis		500	1500	7	7

Tree species	Common Name	Annual rainfall required		Drought resistance	
		Minimum	Maximum	During Planting	Mature Tree
Pongamia Pinnata	Karanj	500	2500	7	7
Casia siamea		500	700	6	7
Anacardium occidentale	Cashew	500	3500	6	8
Holoptelia integrifolia		500	2000	7	8
Acacia catechu	Katha	500	2000	5	7
Boswellia serrata	Lobaw	500	1250	6	7
Butea monosperma	Palash	500	4500	6	6
Cassea fistula	Amaltas	500	3000	6	6
Albizia amara		500	1000	6	7
Dalbergia latifolia	Eastern Rosewood	500	5000	5	6
Erythrina Indica	Coral Tree	500	1500	5	6
Ficus bengalensis	Banyan	500	4000	6	7
Ficus religiosa	Peepal	500	5000	6	7
Santalum album	Sandal	500	1500	6	7
Syzgium cuminii	Clove	500	5000	5	5
Terminalia alata		500	3650	5	6
Madhuca latifolia	Mahua	550	1500	8	9
Acacia auriculiformis		600	1800	6	6
Terminalia bellirica	Harad	600	3000	5	6
Dendrocalamus strictus	Lathi Baans	750	5000	5	6
Moringa oleifera	Drumstick	750	2000	5	5
Terminalia arjuna	Arjun	750	1750	5	5

Annexure 2.2 : Native species for different agro-climatic zones

Central Highlands

Agro-climatic zone	Central Highlands (1)	Central Highlands (2)
Soil type	Red and black soils	Medium to dark black soils
Climatic condition	Sub-humid	Semi-arid
Shrubs with fragrant flowers	Lawsonia alba	Tabernaemontana coronaria
	Nyctanthes arbortristis	Lawsonia alba
	Thevetia neriifolia	Nyctanthes arbortristis
		Mimusops elengi
		Murraya exotica
		Cestrum nocturnum
		Thevetia neriifolia
Ornamental and flowering trees	Cochlospermum gossypium	Jacaranda mimosaefolia
	Terminalia arjuna	Cochlospermum gossypium
	Lagerstroemia flosreginae	Terminalia arjuna
	L. thorellii	Lagerstroemia flosreginae
	Peltophorum inerme	L. thorellii
	Butea frondosa	Peltophorum inerme
	Bauhinia purpurea	Butea frondosa
	B. tomentosa	Bauhinia purpurea
	B. triandra	B. tomentosa
	B. variegata	B. triandra
	B. acuminata	B. variegata
	B. corymbosa	B. acuminata
	B. alba	B. corymbosa
	Browne coccinia	B. alba
	B. ariza	Browne coccinia
	B. grandiceps	B. ariza
	Cassia fistula	B. grandiceps
	C. javanica	Cassia fistula
	Caesalpinioideae nodosa	C. javanica
	Poinciana elata	Caesalpinioideae nodosa
	Pongamia glabra	Milletia ovalifolia
	Hibiscus collinus	Poinciana elata
	Kydia calycina	Pongamia glabra
	Ficus bengalensis	Hibiscus collinus
	Moringa oleifera	Kydia calycina
	Madhuka latifolia	Ficus bengalensis
	Pithecolobium dulce	Moringa oleifera
	Mangifera indica	Madhuka latifolia
	Bamboo sps	Pithecolobium dulce
		Mangifera indica
		Bamboo sps

		Deccan Plateau	D
Agro-climatic zone	Deccan Plateau (3)	(4)	eccan Plateau (5)
Soil type	Red and black soils	Black soils	Red and black soils
Climatic condition	Arid	Semi-arid	Semi arid
Shrubs with fragrant flowers	Tabernaemontana coronaria	Tabernaemontana coronaria	Tabernaemontana coronaria
		Lawsonia alba	
	Nyctanthes arbortristis	Lam	Hiptage madablota
		Hiptage	Nyctanthes
	Murraya exotica	madablota	arbortristis
		Nyctanthes	
		arbortristis	Gardenia florida
		Gardenia florida	G.lucida
		G.lucida	G. latifolia
		G. latifolia	Ixora parviflora
		Ixora parviflora	Gardenia resinifera
		Gardenia	Anthocephalus
		resinifera	cadamba
		Anthocephalus	
		cadamba	Mimusops elengi
		Mimusops elengi	Murraya exotica
		Murraya exotica	Cestrum nocturnum
		Cestrum	
		nocturnum	Thevetia neriifolia
		Thevetia neriifolia	
Ornamental and flowering trees	Terminalia arjuna	Plumeria acutifolia	Plumeria acutifolia
	Lagerstroemia flosreginae	P. rubra	P. rubra
	L. thorellii	P. alba	P. alba
	Bauhinia purpurea	Bignonia crispa	Bignonia crispa
		Jacaranda	Jacaranda
	B. tomentosa	mimosaefolia	mimosaefolia
		Spathodea	Spathodea
	B. triandra	campanulata	campanulata
		Millingtonia	
	B. variegata	hortensis	Millingtonia hortensis
		Cochlospermum	Cochlospermum
	B. acuminata	gossypium	gossypium
	B. corymbosa	Cordia sebestena	Cordia sebestena
	B. alba	Terminalia arjuna	Terminalia arjuna
	Browne coccinia	Crataeva religiosa	Crataeva religiosa
		Lagerstroemia	Lagerstroemia
	B. ariza	flosreginae	flosreginae
	B. grandiceps	L. thorellii	L. thorellii
		Enterolobium	
	Peltophorum ferrugineum	saman	Enterolobium saman

		Deccan Plateau	D
Agro-climatic zone	Deccan Plateau (3)	(4)	eccan Plateau (5)
Soil type	Red and black soils	Black soils	Red and black soils
Climatic condition	Arid	Semi-arid	Semi arid
		Peltophorum	
	Poinciana elata	inerme	Peltophorum inerme
	Pongamia glabra	Butea frondosa	Butea frondosa
	Mangifera indica	Bauhinia purpurea	Bauhinia purpurea
	Bamboo sps	B. tomentosa	B. tomentosa
		B. triandra	B. triandra
		B. variegata	B. variegata
		B. acuminata	B. acuminata
		B. corymbosa	B. corymbosa
		B. alba	B. alba
		Browne coccinia	Browne coccinia
		B. ariza	B. ariza
		B. grandiceps	B. grandiceps
		Cassia fistula	Cassia fistula
		C. javanica	C. javanica
		Caesalpinioideae	Caesalpinioideae
		nodosa	nodosa
		Gliricidia maculata	Gliricidia maculata
		Milletia ovalifolia	Milletia ovalifolia
		Enterolobium	
		saman	Enterolobium saman
		Peltophorum	Peltophorum
		ferrugineum	ferrugineum
		Saraca indica	Saraca indica
		Poinciana regia	Poinciana regia
		Poinciana elata	Poinciana elata
		Pongamia glabra	Pongamia glabra
		Pterocarpus	
		indicus	Pterocarpus indicus
		Hibiscus collinus	Hibiscus collinus
		Kydia calycina	Kydia calycina
		Thespesia	
		populnea	Thespesia populnea
		Ficus bengalensis	Ficus bengalensis
		Moringa oleifera	Moringa oleifera
		Madhuka latifolia	Madhuka latifolia
		Guaiacum	
		officinale	Sterculia foetida
		Terminalia	
		catappa	Guaiacum officinale
		Pithecolobium	
		dulce	Pithecolobium dulce
		Mangifera indica	Mangifera indica
		Bamboo sps	Bamboo sps

		Deccan Plateau	D
Agro-climatic zone	Deccan Plateau (3)	(4)	eccan Plateau (5)
Soil type	Red and black soils	Black soils	Red and black soils
Climatic condition	Arid	Semi-arid	Semi arid
Trees with ornamental		Polyalthia	
foliage	Tamarindus indica	longifolia	Polyalthia longifolia
		Putranjiva	
	Azadirachta indica	roxburghii	Putranjiva roxburghii
		Tamarindus indica	Tamarindus indica
		Acacia	
		auriculiformis	Acacia auriculiformis
		Azadirachta indica	Azadirachta indica
		Moringa	Moringa
		plerygosperma	plerygosperma
		Callistemon	Callistemon
		lanceolatus	lanceolatus
		Eucalyptus	
		citriodora	Eucalyptus citriodora
Shade trees	Tamarindus indica	Tamarindus indica	Azadirachta indica
	Azadirachta indica	Azadirachta indica	Azadirachta indica
		Mangifera indica	Mangifera indica

Eastern Plains

Agro-climatic zone	Eastern coastal plain (6)	Eastern Plain (8)	Eastern Plain (9)
Soil type	Alluvium	Alluvium derived soils	Red and yellow soils
Climatic condition	Sub-humid	Subhumid	Perhumid-subhumid
Shrubs with fragrant flowers	Artabotrysodoratissimus		Artabotrysodoratissimus
	Hiptage madablota		Magnolia grandiflora
	Ixora parviflora		Michelia champaca
	Gardenia resinifera		Ixora parviflora
			Anthocephalus cadamba
Ornamental and flowering trees	Plumeria acutifolia	Dillenia indica	Plumeria acutifolia
	P. rubra		P. rubra
	P. alba		P. alba
	Bignonia crispa		Bignonia crispa
	Dillenia indica		Jacaranda mimosaefolia

Agro-climatic zone	Eastern coastal plain (6)	Eastern Plain (8)	Eastern Plain (9)
Soil type	Alluvium	Alluvium derived soils	Red and yellow soils
Climatic condition	Sub-humid	Subhumid	Perhumid-subhumid
	Lagerstroemia flosreginae		Millingtonia hortensis
	L. thorellii		Dillenia indica
	Amherstia nobilis		Lagerstroemia flosreginae
	Enterolobium saman		L. thorellii
	Cassia fistula		Amherstia nobilis
	C. javanica		Enterolobium saman
	Caesalpinioideae nodosa		Butea frondosa
	Gliricidia maculata		Cassia fistula
	Enterolobium saman		C. javanica
	Peltophorum ferrugineum		Caesalpinioideae nodosa
	Saraca indica		Erythrina indica
	Poinciana regia		E. Blakei
	Pterocarpus indicus		E. crista-galli
	Thespesia populnea		Enterolobium saman
	Mussaenda glabrata		Peltophorum ferrugineum
	Casuarina equisitifolia		Saraca indica
			Poinciana regia
			Poinciana elata
			Pongamia glabra
			Kydia calycina
			Chorisia speciosa
			Thespesia populnea
			Ficus bengalensis
			Moringa oleifera
			Madhuka latifolia
			Sterculia foetida
			Mesua ferra
			Bamboo sps
Trees with ornamental foliage	Polyalthia longifolia	Sapium sebiferum	Polyalthia longifolia
	Putranjiva roxburghii	Grevillea robusta	Putranjiva roxburghii
	Casuarina equisitifolia		Azadirachta indica
			Melia azedarach
			Moringa plerygosperma
Shade trees	Casuarina equisitifolia	Grevillea robusta	Azadirachta indica
			Melia azedarach

Eastern Plateau

	Eastern Ghats Tamil Nadu Uplands (7)	Eastern Plateau (10)	Eastern Plateau (11)
Agro-climatic zone			
Soil type	Red loamy soils	Red and lateritic soils	Red and yellow soils
Climatic condition	Semi-arid	Sub-humid	Sub-humid
Shrubs with fragrant flowers	Tabernaemontana coronaria	Tabernaemontana coronaria	Tabernaemontana coronaria
	Hiptage madablota	Gardenia florida	Lawsonia alba Lam
	Nyctanthes arbortristis	G.lucida	Gardenia florida
	Gardenia florida	G. latifolia	G.lucida
	G.lucida	Ixora parviflora	G. latifolia
	G. latifolia	Anthocephalus cadamba	Mimusops elengi
	Ixora parviflora	Mimusops elengi	Thevetia neriifolia
	Gardenia resinifera	Cestrum nocturnum	
	Anthocephalus cadamba		
	Mimusops elengi		
	Murraya exotica		
	Cestrum nocturnum		
Ornamental and flowering trees	Plumeria acutifolia	Plumeria acutifolia	Jacaranda mimosaefolia
	P. rubra	P. rubra	Cochlospermum gossypium
	P. alba	P. alba	Cordia sebestena
	Bignonia crispa	Bignonia crispa	Terminalia arjuna
	Millingtonia hortensis	Millingtonia hortensis	Lagerstroemia flosreginae
	Cochlospermum gossypium	Cochlospermum gossypium	L. thorellii
	Terminalia arjuna	Cordia sebestena	Butea frondosa
	Crataeva religiosa	Terminalia arjuna	Bauhinia purpurea
	Dillenia indica	Crataeva religiosa	B. tomentosa
	Lagerstroemia flosreginae	Dillenia indica	B. triandra
	L. thorellii	Lagerstroemia flosreginae	B. variegata
	Enterolobium saman	L. thorellii	B. acuminata
	Butea frondosa	Amherstia nobilis	B. corymbosa
	Bauhinia purpurea	Enterolobium saman	B. alba
	B. tomentosa	Butea frondosa	Browne coccinia
	B. triandra	Bauhinia purpurea	B. ariza
	B. variegata	B. tomentosa	B. grandiceps
	B. acuminata	B. triandra	Cassia fistula
	B. corymbosa	B. variegata	C. javanica
	B. alba	B. acuminata	Caesalpinioideae nodosa
	Browne coccinia	B. corymbosa	Saraca indica
	B. ariza	B. alba	Poinciana regia

	B. grandiceps	Browne coccinia	Pongamia glabra
	Cassia fistula	B. ariza	Hibiscus collinus
	C. javanica	B. grandiceps	Kydia calycina
	Caesalpinioideae nodosa	Cassia fistula	Thespesia populnea
	Gliricidia maculata	C. javanica	Ficus bengalensis
	Milletia ovalifolia	Caesalpinioideae nodosa	Moringa oleifera
	Enterolobium saman	Erythrina indica	Madhuka latifolia
	Peltophorum ferrugineum	E. Blakei	
	Saraca indica	E. crista-galli	
	Poinciana regia	Enterolobium saman	
	Poinciana elata	Peltophorum ferrugineum	
	Pongamia glabra	Saraca indica	
	Pterocarpus indicus	Poinciana elata	
	Hibiscus collinus	Pongamia glabra	
	Kydia calycina	Hibiscus collinus	
	Thespesia populnea	Kydia calycina	
	Moringa oleifera	Chorisia speciosa	
	Mussaenda glabrata	Thespesia populnea	
	Madhuka latifolia	Ficus bengalensis	
	Sterculia foetida	Moringa oleifera	
	Guaiacum officinale	Madhuka latifolia	
	Casuarina equisitifolia	Sterculia foetida	
	Bamboo sps	Mangifera indica	
		Morus alba	
		Bamboo sps	
Trees with ornamental foliage	Polyalthia longifolia	Polyalthia longifolia	Polyalthia longifolia
	Putranjiva roxburghii	Putranjiva roxburghii	Putranjiva roxburghii
	Tamarindus indica	Tamarindus indica	Tamarindus indica
	Acacia auriculiformis	Acacia auriculiformis	Acacia auriculiformis
	Azadirachta indica	Azadirachta indica	Azadirachta indica
	Moringa plerygosperma	Moringa plerygosperma	Melia azedarach
	Callistemon lanceolatus	Callistemon lanceolatus	Moringa plerygosperma
	Eucalyptus citriodora	Eucalyptus citriodora	Eucalyptus citriodora
Shade trees	Tamarindus indica	Eugenia cuspidata	Melia azedarach
	Azadirachta indica	Tamarindus indica	Tamarindus indica

Agro-climatic zone	North Eastern Hills (12)	Northern Plain (13)	Northern Plain (14)
Soil type	Red and lateritic soils	Alluvium derived soils	Alluvium derived soils
Climatic condition	Perhumid	Semi-arid	Sub-humid
Shrubs with fragrant flowers	Artabotrysodoratissimus	Tabernaemontana coronaria	Tabernaemontana coronaria
	Magnolia grandiflora	Hiptage madablota	Lawsonia alba Lam
	Michelia champaca	Nyctanthes arbortristis	Magnolia grandiflora
	Ixora parviflora	Gardenia florida	Gardenia florida
		G.lucida	G.lucida
		G. latifolia	G. latifolia
		Ixora parviflora	Ixora parviflora
		Anthocephalus cadamba	Anthocephalus cadamba
		Mimusops elengi	Mimusops elengi
		Murraya exotica	Murraya exotica
		Citrus aurantium	Citrus aurantium
		Cestrum nocturnum	
		Thevetia neriifolia	
Ornamental and flowering trees	Plumeria acutifolia	Plumeria acutifolia	Jacaranda mimosaefolia
	P. rubra	P. rubra	S. nilotica
	P. alba	P. alba	Cochlospermum gossypium
	Dillenia indica	Jacaranda mimosaefolia	Terminalia arjuna
	Lagerstroemia flosreginae	S. nilotica	Crataeva religiosa
	L. thorellii	Millingtonia hortensis	Lagerstroemia flosreginae
	Amherstia nobilis	Cochlospermum gossypium	L. thorellii
	Enterolobium saman	Cordia sebestena	Peltophorum inerme
	Cassia fistula	Terminalia arjuna	Cassia fistula
	C. javanica	Crataeva religiosa	C. javanica
	Caesalpinioideae nodosa	Lagerstroemia flosreginae	Caesalpinioideae nodosa
	Enterolobium saman	L. thorellii	Erythrina indica
	Peltophorum ferrugineum	Peltophorum inerme	E. Blakei
	Saraca indica	Butea frondosa	E. crista-galli
	Poinciana regia	Bauhinia purpurea	Poinciana regia

Agro-climatic zone	North Eastern Hills (12)	Northern Plain (13)	Northern Plain (14)
Soil type	Red and lateritic soils	Alluvium derived soils	Alluvium derived soils
Climatic condition	Perhumid	Semi-arid	Sub-humid
	Mesua ferra	B. tomentosa	Poinciana elata
	Bamboo sps	B. triandra	Pongamia pinnata
	Anthocephalus cadamba	B. variegata	Hibiscus collinus
	Saraca indica	B. acuminata	Kydia calycina
		B. corymbosa	Chorisia speciosa
		B. alba	Ficus bengalensis
		Browne coccinia	Moringa oleifera
		B. ariza	Morus alba
		B. grandiceps	Bamboo sps
		Cassia fistula	
		C. javanica	
		Caesalpinioideae nodosa	
		Erythrina indica	
		E. Blakei	
		E. crista-galli	
		Milletia ovalifolia	
		Poinciana regia	
		Poinciana elata	
		Pongamia pinnata	
		Hibiscus collinus	
		Kydia calycina	
		Thespesia populnea	
		Ficus bengalensis	
		Moringa oleifera	
		Dalbergia sissoo	
		Pithecolobium dulce	
		Morus alba	
		Bamboo sps	
Trees with ornamental foliage	Delonix regia	Polyalthia longifolia	Polyalthia longifolia
		Anogeissus pendula	Putranjiva roxburghii
		Putranjiva roxburghii	Tamarindus indica
		Tamarindus indica	Acacia auriculiformis
		Acacia auriculiformis	Azadirachta indica
		Azadirachta indica	Moringa plerygosperma
		Melia azedarach	Callistemon

Agro-climatic zone	North Eastern Hills (12)	Northern Plain (13)	Northern Plain (14)
Soil type	Red and lateritic soils	Alluvium derived soils	Alluvium derived soils
Climatic condition	Perhumid	Semi-arid	Sub-humid
			lanceolatus
			Eucalyptus
		Moringa plerygosperma	citriodora
		Callistemon lanceolatus	Bamboo sps
		Eucalyptus citriodora	
		Bamboo sps	
Shade trees	Delonix regia	Diospyros embryopteris	Eugenia cuspidata
		Eugenia cuspidata	Ficus infectoria
		Ficus infectoria	F. retusa
		F. retusa	
		Dalbergia sissoo	

Western Region

Agro-climatic zone	Western Ghat (15)	Western Himalayas (16)	Western Himalayas (17)	Western Plain (18)
Soil type	Red and laterite soils	Brown soils and podzolic soils	Shalow skeletol soils	Desert and saline soils
Climatic condition	Perhumid to subhumid	Sub-humid	Arid	Arid
Shrubs with fragrant flowers	Artabotrysodoratissimus			Lawsonia alba Lam
	Hiptage madablota			Thevetia neriifolia
	Nyctanthes arbortristis			
	Gardenia resinifera			
	Murraya exotica			
Ornamental and flowering trees	Plumeria acutifolia	Salix spp	Salix spp	Tecomella undulata
	P. rubra	Pinusspp	Pinus spp	Peltophorum inerme
	P. alba	Cedrus deodara	Cedrus deodara	Butea frondosa
	Bignonia crispa	Rhododendron	Rhododendron	Ficus bengalensis
	Spathodea campanulata	Aurocaria	Abies	Pithecolobium dulce
	Crataeva religiosa	Abies	Picea	Prosopis cineraria
	Dillenia indica	Picea	Aurocaria	Acacia nilotica
	Lagerstroemia		Platanus	Acacia tortilis

Agro-climatic zone	Western Ghat (15)	Western Himalayas (16)	Western Himalayas (17)	Western Plain (18)
Soil type	Red and laterite soils	Brown soils and podzolic soils	Shalow skeletol soils	Desert and saline soils
Climatic condition	Perhumid to subhumid	Sub-humid	Arid	Arid
	flosreginae		kashmeriana [Chinar]	
	L. thorellii			Salvadora persica
	Enterolobium saman			Azadirachta indica
	Bauhinia purpurea			
	B. tomentosa			
	B. triandra			
	B. variegata			
	B. acuminata			
	B. corymbosa			
	B. alba			
	Browne coccinia			
	B. ariza			
	B. grandiceps			
	Cassia fistula			
	C. javanica			
	Caesalpinioideae nodosa			
	C. renigera			
	Gliricidia maculata			
	Enterolobium saman			
	Peltophorum ferrugineum			
	Poinciana regia			
	Pterocarpus indicus			
	Kydia calycina			
	Thespesia populnea			
	Mussaenda glabrata			
	Madhuka latifolia			
	Sterculia foetida			
	Casuarina equisitifolia			
	Bamboo sps			
Trees with ornamental foliage	Polyalthia longifolia	Sapium sebiferum		Anogeissus pendula

Agro-climatic zone	Western Ghat (15)	Western Himalayas (16)	Western Himalayas (17)	Western Plain (18)
Soil type	Red and laterite soils	Brown soils and podzolic soils	Shalow skeletol soils	Desert and saline soils
Climatic condition	Perhumid to subhumid	Sub-humid	Arid	Arid
	Putranjiva roxburghii			Azadirachta indica
	Moringa plerygosperma			Eucalyptus citriodora
	Bamboo sps			

Annexure 2.3 : Rain water run-off for different roof top areas

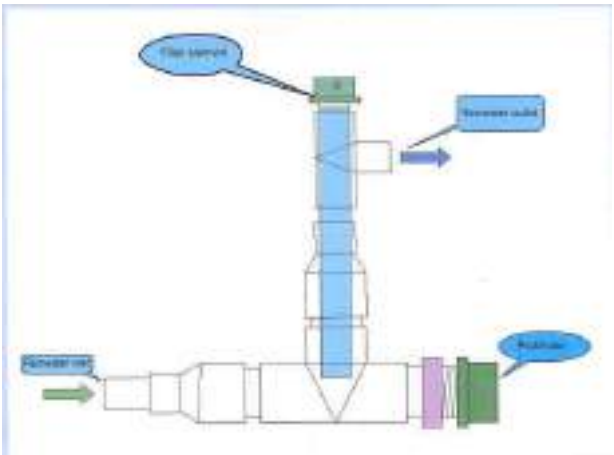
Rain Fall in mm →	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Roof Top Area m^2 ↓	Harvested water from Roof Tops m^3 (80% of gross precipitation)																			
20	2	3	5	6	8	10	11	13	14	16	18	19	21	22	24	26	27	29	30	32
30	2	5	7	10	12	14	17	19	22	24	26	29	31	34	36	38	41	43	46	48
40	3	6	10	13	16	19	22	26	29	32	35	38	42	45	48	51	54	58	61	64
50	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
60	5	10	14	19	24	29	34	38	43	48	53	58	62	67	72	77	82	86	91	96
70	6	11	17	22	28	34	39	45	50	56	62	67	73	78	84	90	95	101	106	112
80	6	13	19	26	32	38	45	51	58	64	70	77	83	90	96	102	109	115	122	128
90	7	14	22	29	36	43	50	58	65	72	79	86	94	101	108	115	125	134	144	154
100	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160
110	9	18	26	35	44	53	62	70	79	88	97	106	114	123	132	141	150	158	167	176
120	10	19	29	38	48	58	67	77	86	96	106	115	125	134	144	154	163	173	182	192
130	10	21	31	42	52	62	73	83	94	104	114	125	135	146	156	166	177	187	198	208
140	11	22	34	45	56	67	78	90	101	112	123	134	146	157	168	179	190	202	213	224
150	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240
200	16	32	48	64	80	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320
250	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400
300	24	48	72	96	120	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480
400	32	64	96	128	160	192	224	256	288	320	352	384	416	448	480	512	544	576	608	640
500	40	80	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720	760	800
1000	80	160	240	320	400	480	560	640	720	800	880	960	1040	1120	1200	1280	1360	1440	1520	1600
2000	160	320	480	640	800	960	1120	1280	1440	1600	1760	1920	2080	2240	2400	2560	2720	2880	3040	3200
3000	240	480	720	960	1200	1440	1680	1920	2160	2400	2640	2880	3120	3360	3600	3840	4080	4320	4560	4800

Annexure 2.4 : Details of filtration systems

The following section gives details of a few filtration systems, which can be used during conveyance of harvested water before it enters the storage tank or recharge structures:

1. Pop up filter

Popup Filter is a form of first flush device, which includes three components namely rainwater receptor, flush valve, and filter element. Rainwater receptor is where the rainwater is allowed to flow from down pipes and a flush valve is provided to flush the first flow of the rainwater along with leaves, dust etc. Water received in the receptor flows upwards against gravity through a filter element to filter most floating elements and allow water to stabilize in this filtration zone. Rainwater passing through this filter element (which is relatively cleaner), flows out through an outlet, which can lead to storage device. Filter element is mounted on a vertical stabilizer pipe with a friction fit. In the normal course, rainwater gets filtered and flows through outlet into the storage device. Filter element needs to be cleaned periodically during the rainy season to remove the material and to keep the filtration system clean. In the event where the filter is not cleaned and the filter element is getting clogged, the 'PopUp Filter' has a built-in safety feature to push out the filter element from the stabilizer pipe and allow the water to flow out freely. This safety feature will avoid flooding of the rooftop because of clogged filter. The first indication of the filter getting clogged is rainwater flowing out of a vent hole provided on the top of the filter element. These pop up filters are simple in design and are very flexible to install in varying field conditions.





PopUp filter mounted on the wall

2. Sand bed filter

Sand Bed filter is a simple filtration system, which includes layers of pebbles, aggregates and coarse riverbed sand laid one over other in a confined masonry structure. Rainwater is allowed on the top from one end and filtered water is drawn from the other end.

3. Stabilization tank

Stabilisation tanks can be used to trap light and heavy impurities with out having any filter media, especially in case of large volumes of water. Rainwater is allowed to flow through a series of small tanks and by providing an entry and exit for water at strategic positions, impurities can be trapped in the stabilization tanks for subsequent cleaning. Heavier impurities will get trapped in the first two tanks as the water flows out at the higher level. Lighter and floating impurities get trapped in the third and fourth tanks as the water flows out at the bottom or lower level. Periodic cleaning of these tanks is required to remove the impurities.

(Source: KSCST, IIS, Amruthavarshini: A guide for rainwater harvesting, Bangalore2005)

4. Oil and grease filter

Rainwater Harvester, which filters runoff water from roads, which generally contains oil and grease has been developed by EA water Pvt. Ltd. This system has a sand filter, which filters silt from runoff harvested from roof, lawns and parking area. The cost of the filter is around Rs 60,000.

Source : www.eawater.com

Reference :

1. National Building Code of India, 2005
2. Rajiv Gandhi National Drinking water mission, Technical document on Water harvesting and Artificial recharge, Delhi, December 2004. (p.45)
3. Assessment of water supply options, contributing paper on Rainwater harvesting submitted to the World Commission on Dams, Gould John, 1999. (http://www.dams.org/docs/kbase/contrib/opt163.pdf)
4. Shivakumar A.R, Amruthavarshini- A guide for rainwater harvesting, Karnataka State Council for Science & Technology, IIS, Bangalore, 2005
5. Central Ground Water Board publications
6. TERI–Green Rating for Integrated Habitat Assessment

Chapter 3 Managing transport including noise and air

3.0 Introduction

Transportation and operation of construction machinery are integral part of large construction projects. Any large construction site is never an individual unit, but it is a part of city's system. Road layout affects the users and use patterns on one hand and the operation of construction machinery affect the people residing or working near the site on the other. Both of these activities affect the environment. Right from the commencement of the work, the transportation system and construction activities have to interact with the existing system of the city. This interaction with city's system might be in terms of resource consumption or in the form of power and energy usage, transportation (materials and labour) or the environmental impacts. It is required that these activities may not disturb the balance of city's system in terms of environment and resource consumption.

Some of the factors are important and must be taken into the consideration, while planning, i.e., these activities are generator of noise and air pollution. There is a risk of surface erosion by heavy traffic loads and operation of construction machinery as well. Construction machinery due to its operation produces smoke, dust and noise and vibration. To minimize these negative impacts it is important to design a transportation system with considerations for environment. The design and operational mechanism of Transportation system should aim at easy and fast movement. It should also aim at protection of the site from noise and air pollution on one hand and encouraging the use of non-motorized vehicular movement on the other. This chapter deals with the management of transport and construction activities for reduction of its negative impact on environment.

3.1 Scope

The sources of noise and air pollution due to transportation and construction activities can be classified under three heads.

- Use of heavy machineries and vehicles during construction and demolition
- Use of transportation during building operation period
- Operation of D.G. sets

Based over these three heads, the guideline for managing transport (including noise and air) are divided into two parts, first is the planning, i.e., pre-construction stage and second is the construction stage.

3.2 Pre construction (Site Planning) Guidelines

A good transportation system is the one, which is safe for users and facilitates direct, and easy pedestrian and bicycle circulation between the residence and schools, shops, and work places. The design, scale and development plan of neighbourhood should suit such type of safe movement. There should be coordination of land use decisions with existing and planned public transportation services and the needs for non-motorized access. The concerns pertaining to design of such system and the mitigation options have been discussed below.

3.2.1 Concerns

3.2.1.1 Excessive uses of fuel

People tend to use motorized vehicle even for the short distances because of shortage of time, and unsafe conditions for bicycling. This leads excessive use of fuel.

3.2.1.2 Danger of accidents

The danger of accidents in residential areas is very obvious when the roads are not designed properly. The road sections designed without any consideration for footpaths and bicycle tracks result in mixed traffic and accidents. Other consequences of bad transportation system design are traffic congestion and inconvenience to users.

3.2.1.3 Air and noise pollution

Air and noise pollution are the results of the inefficient design of the engines in the vehicles and also the close vicinity of heavy traffic. The short distances between roads and buildings increase the effect of pollution on the buildings and users.

3.2.2 Mitigation Options

Road design should be done with due consideration for environment, and safety of users. Users here are the road users and the people residing or working near the roads. Elements of transport system altogether should create a controlled sense of place, where the chances of accidents are minimized and pollution could be reduced. Following measures should be adopted for this.

Design with clusters layout instead of the linear development: Clusters reduce the long lengths of road and also the vehicular speeds. The parking spaces in cluster development can be provided outside the cluster and building can be protected from heavy vehicular circulation.

Creation of Calm transportation system: Create a transport system where traffic will be calm in neighbourhoods and provide a pedestrian and bicycle friendly travel environment. Traffic in residential, school area, park and commercial areas

can be restricted by regulation and even by the narrow road widths in the campus premises.
Facilities of bicyclists and pedestrians: Construct pedestrian and bicycle facilities with appropriate amenities (i.e. drinking water fountains, benches, bicycle parking, etc.) to encourage and support the use of bicycles. Bicycle tracks should be covered or shadowed by tree canopy.
Promotion of public transport: Enhance High Capacity Transit use through the provision of adequate access for pedestrians and bicycles at bus stops, transit centres, park-and-ride lots and transit stations. Parking spaces near bus stops must be a part of the design. This will encourage the public mode of transportation.
Promotion of use of less polluting vehicle engine: Promote the use of the least polluting type of transportation.

Transportation system is dependent on a number of factors, like design of the engine of the vehicles, traffic rules and regulations, etc., but from construction and development point of view, the above-mentioned mitigation options can be incorporated in design in the form of following heads.

- Hierarchy of roads.
- Road geometry and traffic calming
- Traffic Regulations
- Entry and exit points
- Parking norms

3.2.2.1 Hierarchy of roads

The road system should clearly identify the vehicular and pedestrian circulation. The system should be such that the pedestrian may have ease in moving in whole site in both directions without walking on the major traffic streets. Hierarchy in roads should be adopted to segregate the traffic according to the size, frequency and density of traffic. Following are the norms for the roads of different hierarchy.
Arterial road: These roads are meant for intra-urban through traffic. These roads have no frontage access, no standing vehicle and very little cross traffic and minimum roadway intersection spacing 500 m.
Sub-Arterial Road: These Roads are meant for intra-urban through traffic with frontage access, no standing vehicles having high cross traffic, high capacity intersections and minimum roadway intersection spacing 300 m.
Collector Street: These are the Streets for collecting and distributing traffic from and to local streets and also for providing access but no parked vehicles and having heavy cross traffic and minimum roadway intersection traffic spacing 150 m.
Local Street: Street for access to residence, business or other abutting property, having necessary parking and pedestrian movement.

The Considerations given in Table 3.1 should be incorporated in design to adopt the above-mentioned hierarchy.

Table 3.1: Design considerations for Roads of different Hierarchy

S. No,	Type of Road	Design Speed	Right of way
1	Arterial	80 kph	50-60m
2	Sub-arterial	60 kph	30-40 m
3	Collector street	50 kph	20– 30 m
4	Local Street	30 kph	10-20 m

Source UDPFI guidelines volume i august 1996

The Carriageway widths for the different lane widths will vary. Minimum standard width for single lane road without kerbs should be 3.5 m, for 2-lane without kerb road the carriageway width should be 7.0 m and for 2-lane with kerbs it should be 7.5 m.

Following points should be considered for non-motorized transportation for the cases where the motorized and non-motorized traffic are together.

(i) Footpath/ Sidewalk

Footpaths must be given for safe and easy movement of pedestrians along both the sides of roads. The footpaths should be partly or fully shadowed by trees. Other considerations include width and cross section, materials, lighting and shading, removal of encroachment (hawkers), public toilets and drinking water fountains.

Footpaths should be designed with consideration for restricting hawkers. Some additional space should be provided for hawkers and customers (which can be legally given to a hawkers with nominal rent). Footpath should be made free from hawkers for easy and safe pedestrian movement. The regulation for not allowing hawkers [5]shops should be made strict[6]. The space standards for footpath have been given in Table 3.2.

Table 3.2 Space standards for footpath

Capacity (Persons)		Required width
All in one direction	In both directions	of footpath (m)
1220	800	1.5
2400	1600	2.0
3600	2400	2.5
4800	3200	3.0
6000	4000	4.0

Source: UDPFI Guidelines volume 1 August 1996

[5] Although traffic regulations and protection of vulnerable road users is not the part of duty of a developer, but the design of site should be helpful to accommodate the same.

[6] Non-Motorised vehicles in Ten Asian cities, (Washington DC, World Bank), 1995

The width of sidewalk depends upon the expected pedestrian flows and should be fixed with the help of guidelines given by IRC in IRC: 103-1988[7].
Footpath design should meet with the requirements and standards (guard rail, Gaps/ setback distances, crossings, lighting) given in IRC: 103-1988[8].

(ii) Bicycle track
When the number of motor vehicles using the route is more than 200 per hour, separate, cycle tracks may be justified even if the cycle traffic is only 100 per hour. The space standards for bicycle tracks have been given in Table 3.3. Bicycles and cycle rickshaws' movement should be made safe an comfortable by providing separate tracks, with tough and uniform paving, and easy gradients, and trees. According to IRC: 11-1962, separate cycle track can be provided when the peak hour cycle traffic is 400 or more on routes with a traffic of 100 motor vehicles or more but not more that 200 per hour. For further details of design and layout of cycle tracks, IRC: 11-1962 should be referred[9].

Table 3.3: Space standards for bicycle tracks

Width of Cycle Track	(m)	Capacity (Cycles/hr) One way	Two Way
Two lanes	3	250-600	50-250
Three lanes	4	7600	250-600
Four lanes	5		>600

Source: UDPFI Guidelines volume 1 August 1996

(iii) Foot over Bridges and Subways
The foot over bridges and subways must be a part of footpath design. These should have ramps and accelerators for convenience of senior citizens and people with disability. Over bridges must be provided with adequate vertical clearance as stipulated in IRC: 86-1983.
Norms given in Section 8.4 and 8.5 of IRC: 103-1988, must be followed for design and layout of subway.

3.2.2.2 Geometric Design Improvements for Road Safety
Geometric design of the roads must ensure safety. Some of the crucial elements in geometric design are given below[10].
Developers must design the system with the standards given with the heading given below.

1. Horizontal alignment (refer section 10 of IRC: 86-1983)

[7] IRC : 103-1998
[8] IRC : 11-1962
[9] IRC : 11-1962
[10] Indian Road Congress Codes

2. Vertical alignment (refer section 11 of IRC: 86-1983)
3. Sight distance (refer section 9 of IRC: 86-1983)
4. Longitudinal section and Cross section (pavement width, shoulder width and type, lane width), roadside design (width, slopes and condition).
5. Medians (refer section 6.2.3 of IRC: 86-1983)
6. Design of intersections, turns and rotaries (refer IRC: 65-1976)
7. Blind corner design with rectified sight distances (refer section 9 of IRC: 86-1983)
8. Reduction of vehicular damage by improving upon road surface pavement (for this refer "Tentative Guidelines on the provision of speed breakers for control of vehicular speeds on the minor roads", IRC: 99-1988)

Apart from this some general points should be considered, these are:

Visibility over footpaths and Bicycle track: The landscaping must be done in a way that its elements should not obstruct the visibility as well the movement. Lighting must be adequate for visibility during nighttimes.

Landscaping of street: Landscape plan must have consideration for efficient functioning of the road system as well as the physical and visual comfort and aesthetics. Green belt should help to demarcate the automobile highway unite with the one glance. Pedestrian promenade should be covered with shade along the shops. Motorized vehicular lane (MV lanes) can be provided with single or double-sided high foliage trees, which permit the visibility. For pedestrians, a multiple row of trees with very heavy deciduous foliage is required so that the sun rays may pass through in winter. There must be some evergreen trees also with dark and glistening foliage.

Vertical and Horizontal clearances of overhead electric power and telecommunication lines[11] - Minimum vertical clearance for different categories of overhead conductor installation should be as under:

- for ordinary wires and lines carrying very low voltage up to and including 110 volts, e.g., telecommunication lines- 5.5 M
- for electric power lines carrying voltage up to and including 650 volts- 6M
- for electrical power lines carrying voltage exceeding 650 volts-6.5 M

Guard cradle or screen should be provided for electrical power lines carrying voltage exceeding 110 volts while crossing the road. The cradle should extend desirably over the full right-of-way. However, guards may be omitted in the case of extra high

[11] Notes from IRC : 32 - 1969

voltage lines strung on self-supporting towers designed wit adequate safety.

The standards for horizontal clearance laid down above shall not apply to roads situated in hilly areas. In such areas the poles should be erected preferably on the valley side, as far away from the edge of the road as practicable.

Horizontal clearances in respect of poles erected for the purpose of street lighting shall be as under:

- For Roads with raised kerb : Minimum 300 mm from the edge of the raised kerb; 600mm being preferable.
- For roads without raised kerbs: At least 1.5 meter from the edge of the carriageway, subject to minimum of 5.0 meter from the center line of the carriage way.

3.2.2.3 Traffic Calming

Traffic calming is a good measure to reduce the vehicular speed and reducing the noise and air pollution and make the system pedestrian and bicyclist friendly. Traffic calming improves the transportation system in terms of visual comfort too. This should be done by the use of physical fixtures such as speed humps and traffic circles to control the speed and movement of vehicles. These measures are effective on the roads passing through universities, hospital zones, residential areas and schools.

The tools of traffic calming are

1. Installation of speed humps by raising the surface of the street in certain spots.
2. Narrowing the street to give drivers the feeling they are in a crowded place, which will make them slow down and totally or partially blocking half the entrance to a side street so drivers cannot turn in but still can come out.
3. Speed tables, build outs, etc.

The Regulations in traffic should be done by Traffic regulation although is a managerial and operational topic, still the considerations for this are required for geometric design.

Enactment of laws is required for

1. Regulation of stopping, standing and parking of vehicles
2. Regulation of traffic by police officers or traffic control devices
3. Regulation of speed
4. Designation of one-way streets, through streets and truck rates
5. Establishment of turn prohibitions and non-passing zones
6. Control of access and improving visibility

Enactment and enforcement of such regulations can enhance urban road safety in a significant manner.

3.2.2.4 Entry and Exit point Design

The entry and exit points should be designed in such a way that

1. These should not disturb the existing traffic.
2. There should be adequate provision for parking. Visitors parking should not disturb the traffic of surrounding area.
3. Additional space should be left for the lanes as per the design of existing road, surrounding the site.
4. Bell mouth or arrangement shown in figure 3.1 can be adapted for the safe vehicular movement.

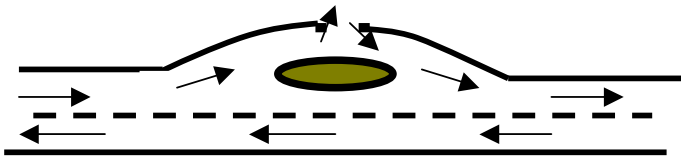


Figure 3.1: Entry and Exit Points

3.2.2.5 Parking requirements

Parking requirement is a function of the use pattern of vehicles. The requirements will vary depending upon the type of the city. The ownership of vehicles and use pattern in India is very diverse, but the standards can be derived from some of the sample cities, which are having different character in terms of population. Area requirement for different types of vehicles is given in Table 3.4. According to population size, the cities have been classified into five categories, i.e., less than 50,000, 50,000 to 2,00,000, 2,00,000 to 10,00,00, 10,00,000 to 50,00,000, and above 50,00,000. Parking requirements have been given for these five categories in Annexure 3.1

Table 3.4 Area requirements for different types of parking

Vehicle type	Area required for parking (m)	Clear height (m)
car	2.5x5	2.2
scooter cycle	3x1.4	2.2
trucks	3.75x10	4.75
Parking requirement for per Car space is as per the floor type.		
Basement	35 sqm	
Stilts	30 sqm	
Open	25 sqm	

Source: National Building Code of India

Based on Annexure 3.1, the parking requirement should be calculated for the respective size of the city. This requirement should be compared with the requirement as per the city norms and then the greater one should be implied. For metropolitan

cities, the norms given in Master plan of Delhi 2001 should be followed as Delhi has maximum usage of cars.

Some special provisions should be done for parking and vehicular operation on railway stations and bus terminals. There should be reservation of 80 per cent site area for the operation of transportation system and 20 per cent of site area for buildings in Rail terminals, integrated passenger terminal, metropolitan passenger terminals, bus terminals and depots, inter-state bus terminals and metro yards for car parking. The space standards for car parking should be followed as specified in Table 3.5.

Table 3.5 Space standards for Car Parking

S.No.	Use Premise	Permissible Equivalent Car :CS) per 100 sq. m. of floor area
1	Residential	2.0
2	Commercial	3.0
3	Manufacturing	2
4	Government	1.8
5	Public and Semi Public facilities	2.0

1. In existing building having plot area of more than 2000 sq. m., extra ground coverage of 5% shall be permissible for construction of automated multilevel parking to provide dedicated parking structures for additional needs.
2. In all premises, parking on the above standards shall be provided within the plot (where the provision exists).
3. Basement(s) up to the setback line maximum equivalent to parking and services requirement, such as installation of electrical and fire fighting equipments, and other services required for the building with prior approval of the concerned agencies, could not be permitted and not to be counted in FAR. However, the area provided for services should not exceed 30% of the basement area. The storage, if provided in the basement, shall be counted in permissible FAR except in the case of residential plot-plotted housing and cluster housing.
4. The side of basement should not project out of the side of the building. The basement(s) beyond the ground coverage shall be kept flushed with the ground and shall be ventilated with mechanical means of ventilation; and
5. Basement(s) shall be designed with due considerations for structural and fire safety.
6. Parking charges should be increased to discourage the use of cars in public spaces.
7. For Multilevel parking following norms must be followed.
   - Multilevel parking facility is to be preferably developed in the designated parking spaces or in the

vacant area, with the following Development control:

- Minimum Plot Size 1000 sqm (However specific proposal, which are technically feasible and viable, could be considered on a cases by case basis for smaller plots by the Authority)
- In addition to the permissible parking spaces (ECS) on max. FAR, 3 times additional space (ECS) has to be provided for parking component only.
- There is no limit for number of basements subject to adequate safety measures.

3.3 Guidelines for reduction of pollution during construction and demolition activities

3.3.1 Concerns

The mains concerns during demolition and construction activities are the emissions generated by the vehicles and the machineries. The main emissions are the dust, noise and the vibrations, which have been discussed below.

3.3.1.1 Dust and emissions

The building material carrying vehicles as well as the construction machinery generate emissions and pollute the environment. Dusts include brick and silica dusts, wood dust from joinery and other woodworking and from earthmoving and other vehicle movements within the site. Asbestos-containing dust especially during the demolition of buildings is very harmful. It is a difficult task to separate these particles. In this way, construction machineries pose a special threat to air quality. They emit a toxic cocktail of nearly 40 carcinogenic substances, and are major sources of fine particulate matter (PM2.5, which lodges deeply in the human lung) and oxides of nitrogen (NOx), a key ingredient in the formation of ground-level ozone and urban smog.

Non-road engines as a class emit more fine particles than the vehicles, trucks. Diesel particles pose the single greatest source of cancer risk from air pollution due to construction machinery. Non-road engines are more polluting than their highway counterparts. Non-road engines remain in use for a very long time, and work on traditional technologies. Since these are very expensive machineries, it is very uneconomical to replace them with machineries with the new machineries with moderate technologies.

3.3.1.2 Noise pollution

Noise generation disturbs the community residing nearby the site. The main sources of noise in the process of construction and demolition activities are pulverizing, cement concrete mixing, welding, aluminium channel

folding, drilling and several other machineries. The noise level of some of these machineries has been given in Table 3.6.

Table 3.6 Typical noise levels of some point sources[12]

Source	Noise Level dB (A)
Air compressor	95-104
110 KVA diesel generator	95
Lathe Machine	87
Milling Machine	112
Oxy-acetylene cutting	96
Pulveriser	92
Riveting	95
Power operated portable saw	108
Steam Turbine (12,500 kW)	91
Pneumatic Chiseling	118
Trains	96
Trucks	90-100
Car horns	90-105
Jet takeoff	120

3.3.1.3 Excessive energy consumption and fuel usage

In the absence of good technologies the fuel usage is going on increasing. The conventional diesel driven machines are huge consumers of fuel and produce smoke as well.

3.3.1.4 Vibrations

Vibrations are caused due to heavy dumpers, DG sets, machineries and bulk careers. These affect the forest, vegetation, organisms as well as the structures on the site too. There is a risk of hearing disorder in the workers. The chopping tools with a vibration effect of more than 120 dB (hand-arm), especially the handheld jackhammer might cause "white finger" disease [13]. The surrounding structures may be damaged or show signs like cracks, etc.

3.3.1.5 Chemical emissions

Construction and demolition activities generate the emissions of toxic substances too, for example magnesium and limestone dust. There is a risk of fire from the tankers carrying chemicals. Volatile organic compounds (VOCs) from emissions from vehicles, fuel tanks and fuel systems and solvents also possess health risk.

[12] http://discovery.bits-pilani.ac.in/dlpd/courses/coursecontent/courseMaterial%5Cetzc362%5CNoice_Pollution_notes.pdf

[13] http://www.eco-web.com/editorial/010802.html#il
White finger disease is a disorder that affects the blood vessels in the fingers, toes, ears, and nose. Its characteristic attacks results from constriction of these blood vessels. Patients initially notice skin discolouration upon cold exposure. They may also experience mild tingling and numbness of fingers or other affected digits that will disappear once the colour returns to normal. When the blood vessel spasms become more sustained, this can cause pain as well as ulceration at the fingertips. Ulcerated fingers or toes can become infected and, with continued lack of oxygen, gangrene may set in.

3.3.2 Mitigation Options

The concerns pertaining to the emissions can be minimised by setting up some norms for air and noise quality. Adopting some technologies can do control on the emissions. Following mitigation options have been given for the same.

3.3.2.1 Control of dust

Adopting techniques like, air extraction equipment, and covering scaffolding, hosing down road surfaces and cleaning of vehicles can reduce dust and vapour emissions. Other measures include appropriate containment around bulk storage tanks and materials stores to prevent spillages entering watercourses.

Dust and smoke is a very general problem with the operation of machinery. Construction machinery needs more information about applications of modified machinery, and effectiveness of these applications. There are many examples of construction machinery improvement, such as using ultra low sulphur fuel, retrofits, and early adoption of filter technology, etc. Construction machineries should be operated with following considerations. The standard limits for this check are given for gasoline driven vehicles and diesel driven vehicles. With effect from 1st April 1996, emission standards are given below:

Pollution under control (PUC) norms of India should be adopted for maintaining the minimum desired quality of air. This check needs to be performed on all vehicles initially one year after its first registration and thereafter once in every six months as per Motor Vehicles Rules, 1989. During PUC test, the following parameters must be measured and assured as per the standards given here:

Gasoline driven 2/3 wheelers: CO < 4.5% by vol., during idling.
Gasoline driven 4 wheelers: CO < 3.0% by vol., during idling.
Diesel driven vehicles: Smoke density < 65% by vol., during both idling & high speed.
For Diesel driven vehicles (Gross vehicle weight < 3500kg and cold start):
CO: 5.0 to 9.0 gm/minute
HC+NOx: 2.0 to 4.0 gm/minute
Smoke density: 65%

The other measures to reduce the air pollution on site are given below.

- Pollution control Check Points should be set up on site.
- On-Road- Inspection should be done for black smoke generating machinery.
- Promotion of use of cleaner Fuel (such as bio-diesel) and Fuel Quality Improvement should be done.
- Inspection should be done for use of covering sheet to prevent dust dispersion at buildings and infrastructure sites, which are being constructed.

- Use of Covering Sheets should be done for trucks to prevent dust dispersion from the trucks, implemented by district offices.

3.3.2.2 Control of noise and vibrations

Equipment like earmuffs, earplugs etc. should be used for hearing protection for workers. For Vibration control damped tools must be used and the number of hours that a worker uses them must be limited.

Bureau of Indian Standards (BIS) has published several codebooks for sampling and analysis of noise pollution and guidelines for control of noise pollution. These codes should be referred for noise control and maintaining minimum standards.

- IS-4954-1968 for Noise abatement in town planning recommendations
- IS-3098-1980 for Noise emitted by moving road vehicles, measurement
- IS-10399-1982 for Noise emitted by stationary road vehicles, methods of measurement
- IS-6098-1971 for Air borne noise emitted by rotating electrical machinery
- IS-4758-1968 for Noise emitted by machines

The noise pollution can be controlled at the source of generation itself by employing techniques like Control in the transmission path Installation of barriers etc. Barriers between noise source and receiver can minimize the noise levels. For a barrier to be effective, its lateral width should extend beyond the line-of-sight at least as much as the height (See Fig. 3.2).

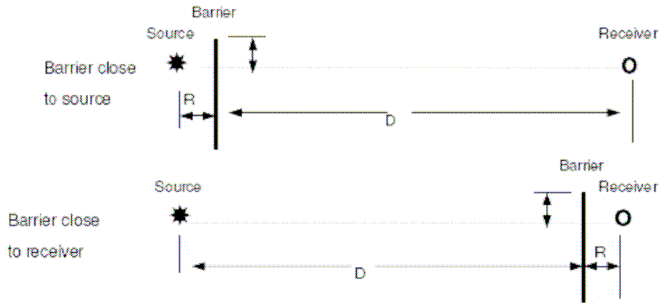


Figure 3.2: Noise barrier

R is the distance between source and barrier. D, the lateral width, is the distance between the receiver and barrier. The light horizontal line shows the line of sight. Barrier should be set in such a way that the height of barrier may break the visual contact of the receiver with the source and the audibility is reduced to standard level, i.e., the levels mentioned in codes given above.

3.3.2.3 Provision for DG sets[14]

The other norms for DG sets[15] are that the diesel generator sets should be provided with integral acoustic enclosure at the manufacturing stage itself. There must be sufficient space for Fuel Tank inside canopy. There must be enough space to house panel. There must be Strong and Heavy-duty steel base frame for housing D.G. Set. There must be provision for Air-Intake and Air-Exhaust silencer(s) for preventing leakage of sound. There must be a provision of Operable doors for easy access to virtually every part of D.G. Sets . There must be Provision of additional screen and hoods for multi-medium noise suppression.

Noise limits for DG sets- The maximum permissible sound pressure level for new diesel generator (DG) sets with rated capacity upto 1000 KVA, manufactured on or after the 1st July, 2003 shall be 75 dB(A) at 1 metre from the enclosure surface.

The Canopies are must for DG sets and must meet CPCB norms of government of India for noise Pollution effective July 2004 and Environment protection Rules, 1986 schedule 1, by Ministry of Environment Forest.

Stack Height :

The minimum height of stack to be provided with each generator set can be worked out using the following formula:

$$H = h + 0.2 \times \ddot{O}KVA$$

H = Total height of stack in metre

h = Height of the building in metres where the generator set is installed

KVA = Total generator capacity of the set in KVA

Based on the above formula the minimum stack height to be provided with different range of generator sets may be categorised as per Table 3.7:

---

[14] Applicability : These rules shall apply to all new diesel engines for genset applications (hereinafter referred to as 'engine') manufactured in India and all diesel engines for genset applications and diesel gensets (hereinafter referred to as 'product', imported into India, after the effective date. Provided that these rules shall not apply to :

1. any engine manufactured or engine or product imported for the purpose of export outside India , or,
2. any engine or product intended for the purpose of sample only and not for sale outside India.

[15] Standards/Guidelines for control of Noise Pollution from Stationary Diesel Generator (DG) sets by Delhi government.

Table 3.7: Stack Height standards for D.G. Sets

For Generator Sets	Total Height of stack in metre
50 KVA	Ht. of the building + 1.5 metre
50-100 KVA	Ht. of the building + 2.0 metre
100-150 KVA	Ht. of the building + 2.5 metre
150-200 KVA	Ht. of the building + 3.0 metre
200-250 KVA	Ht. of the building + 3.5 metre
250-300 KVA	Ht. of the building + 3.5 metre

The certification of space design for DG sets must be done by any one of the following.

1. Automotive Research Association of India, Pune
2. National Physical Laboratory, New Delhi
3. Naval Science & Technology Laboratory, Visakhapatnam
4. Fluid Control Research Institute, Palghat
5. National Aerospace Laboratory, Bangalore

The norms for emissions from D.G. sets have been given by Central pollution control board, these have been given in Table 3.8

Table 3.8: Emission limits for Noise[16]

Capacity of diesel engines	Date of implementation	Emission Limits G/kw-hr) for				Smoke limit (light absorption coefficient, m^{-1})(at full load)	Test cycle	
		NO_2	HC	CO	PM		%	Factors
Upto 19 KW	1.7.2003	9.2	1.3	5.0	0.6	0.7	100	0.05
	1.7.2004	9.2	1.3	3.5	0.3	0.1	75	0.25
> 19 kw upto 50 kW	1.7.2003	9.2	1.3	5.0	0.5	0.7	50	0.30
	1.7.2004	9.2	1.3	3.5	0.3	0.7	25	0.30
>50kW upto 260 kw	1.7.2003	9.2	1.3	3.5	0.3	0.7	10	0.10
>260 kW upto 800kW	1.7.2004	9.2	1.3	3.5	0.3	0.7		

Source: CPCB Norms, The Environment (Protection) Second Amendment Rules, 2002, vide notification G.S.R. 371(E), dated 17th May, 2002, at serial no. 94 (paragraph 1 & 3),

[16] The Environment (Protection) Second Amendment Rules, 2002, vide notification no. G.S.R. 371 (E), dated 17th May, 2002, at serial no. 95,

Annexure 3.1 Area requirements for parking in different types of cities

Sl No.	Occupancy	One Car parking Space for Every				
		Populaton less than 50 000	Population between 50 000 to 200 000	Population between 200 000 to 1 000 000	Population between 1 000 000 to 5 000 000	Population above 5 000 000
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i) a)	Residential			a) 2 tenements having built-up area 101 to 200 m^2	I tenement of 100 m^2 built up area	1 tenement of 75 m^2 built up area
b)	Lodging establishments, tourist homes and hotels, with lodging accommodation	12 guest rooms	8 guest rooms	4 guest rooms	3 guest rooms	2 guest rooms
ii)	Educational			70 m^2 area or fraction thereof of the administrative office area and public service areas	50 m^2area or fraction thereof of the administrative office area and public service areas	35 m^2 area or fraction thereof of the administrative office area and public service areas
(iii)	Institutional (Medical)	20 beds (Private)	15 beds (Private)	10 beds (Private)	5 beds (Private)	2 beds (Private)
		30 beds (Public)	25 beds (Public)	15 beds (Public)	10 beds (Public)	5 beds (Public)
(iv)	a) Assembly halls, cinema theatres	20 seats	80 seats	25 seats	15 seats	10 seats
	b) Restaurants	60 seats	40 seats	20 seats	10 seats	5 seats
	c) Marriage Halls, community halls	600 m^2 plot area	400 m^2 plot area	200 m^2 plot area	50 m^2 plot area	25 m^2 plot area
	d) Stadia and exhibition center	240 seats	160 seats	50 seats	30 seats	20 seats
v) a)	Business Offices and firms for private business	300 m^2 area or fraction thereof	200 m^2 area or fraction thereof	100 m^2 or fraction thereof	50 m^2 area or fraction thereof	25 m^2 area or fraction thereof
b)	Public or semi-public offices	500 m^2 area or fraction thereof	300 m^2 area or fraction thereof	200 m^2 area or fraction thereof	100 m^2 area or fraction thereof	50 m^2 area or fraction thereof
vi)	Mercantile (See Note 2)	300 m^2 area or fraction thereof	200 m^2 area or fraction thereof	100 m^2 area or fraction thereof	50 m^2 area or fraction thereof	25 m^2 area or fraction thereof
vii)	Industrial	400 m^2 area or fraction thereof	300 m^2 area or fraction thereof	200 m^2 area or fraction thereof	100 m^2 area or fraction thereof	50 m^2 area or fraction thereof
viii)	Storage			500 m^2 area or fraction thereof	250 m^2 area or fraction thereof	125 m^2 area or fraction thereof

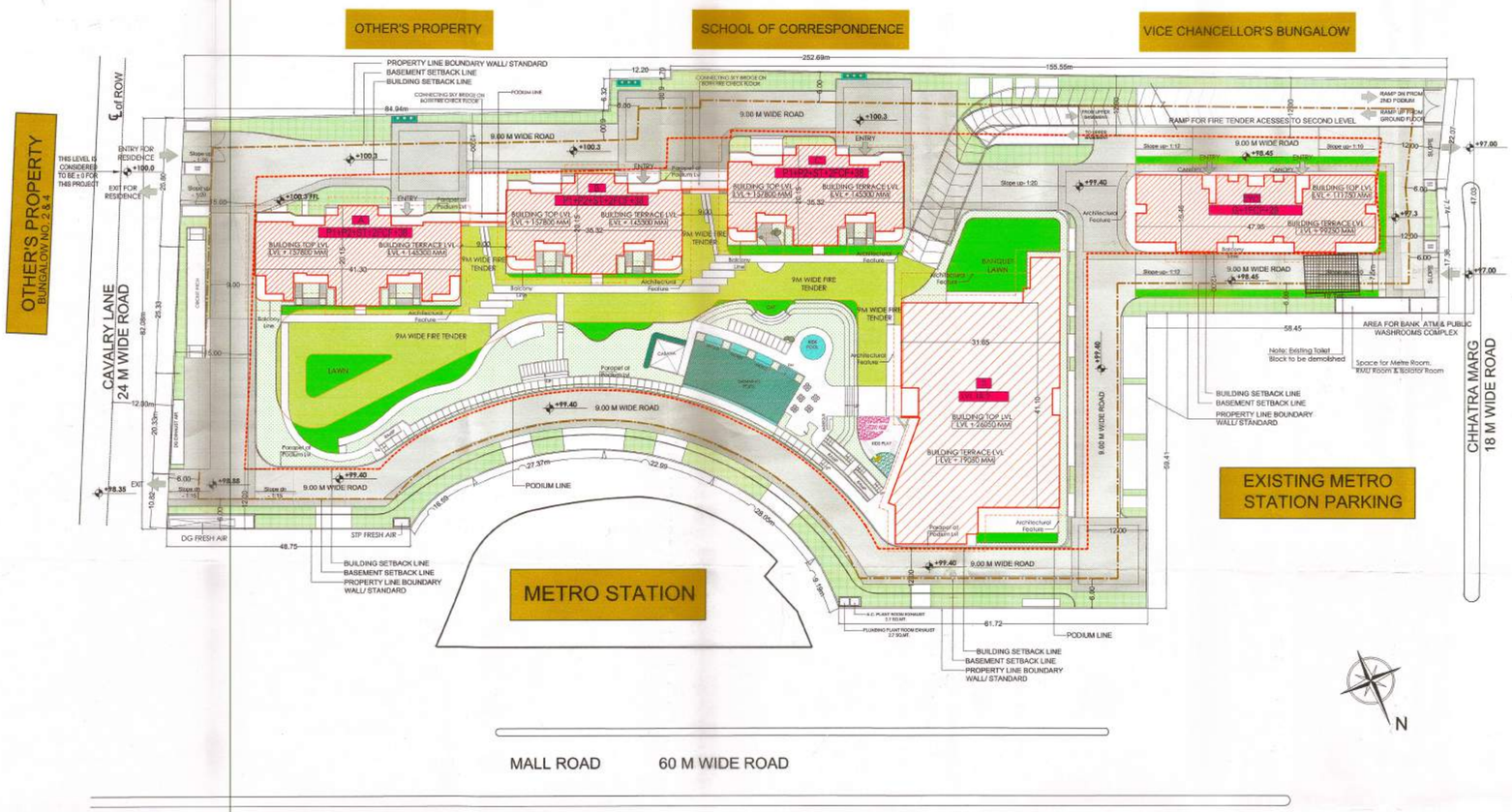
Source: National Building Code of India

Notes

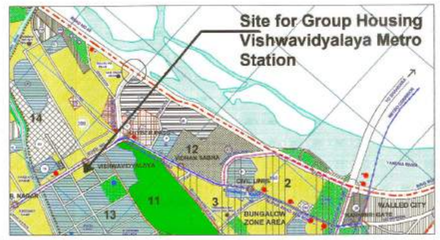
1. In the case of auditoria for educational buildings, parking space shall be provided as per Sl. No. (iv)
2. For plots upto 50 sq. m , as in case of shops, parking spaces need not be insisted upon.
3. For other institutions, transport/communication center, parking space requirement should be assessed based on the proposed building.
4. Not more than 50 % of space in setbacks should be taken up for parking rest under stilts or in basement
5. Minimum width of circulation should be provided for adequate manoeuvring shall be 4m for cars, 5m for trucks.
6. Off street parking should be provided with proper vehicular access. The area for vehicular access shall not be included in the parking area
7. In case of parking in basement at least 2 ramps of adequate size must be provided preferably at the opposite ends.
8. The parking layout should be prepared in such a way that every vehicle becomes directly accessible from circulation driveway
9. For building with different uses parking area required should be calculated on the basis of respective use separately.
10. In case plot containing more than one building parking area should be calculated on the basis of consideration the area of respective uses.

Reference

1. Indian Road Congress Standards
2. Tiwari G., Urban Transport in India, Transportation Research & Injury Prevention Programme, Indian Institute of technology (IIT), Delhi
3. Sustainable Buildings Guidelines 2003 BBC
4. www.arbeidstilsynet.no
5. Official website of Bhaskar power project India
6. Standards/Guidelines for control of Noise Pollution from Stationary Diesel Generator (DG) Sets by Delhi Government
7. System & Procedure For Compliance With Noise Limits For Diesel Generator Sets (Upto 1000 Kva) by Central Pollution Control Board
8. National Road Transport Policy, India
9. Measures for Controlling Vehicle Emissions in Bangkok, Air Quality and Noise Management Division, Air Quality and Noise Management Division, Department of Environment, Bangkok



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	PROPOSED BUILDINGS
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ST	STILTS (ABOVE PODIUM-2)
FCF	FIRE CHECK FLOOR



UNIVERSITY STAFF QUARTERS

CONDITION OF APPROVAL

(i) The applicant shall get the building plans approved form Building. Deptt. of North DMC as per approved layout plan / regulations of Master Plan / Zonal Plan and UBBL - 2016.
(ii) The applicant shall deposit a security amount @ Rs. 5/-per sq.yd of the gross area of plot under the scheme within 15 days of having been intimated of the approval of the layout plan, as a guarantee and laying of services including roads and parking as per the approved layout plan failing which the approval shall not be considered as valid.
(iii) The applicant shall get the services plans approved from respective Services Deptt. before the sanction of building plans and shall lay and maintain the services including roads, parking, landscaping as per approved layout plan / landscape plans / services plans and standard cross sections and other regulations of North DMC to the complete satisfaction of Commissioner, North DMC within period of one year from the date of the approval of layout /services plans, whichever is later , failing which the sanction shall be lapsed. However, a further period of one year may be permitted for development work by the Commissioner, North DMC for the reasons to be recorded.
(iv) The Commissioner, North DMC shall have the right to forfeit a part or whole of the security amount in case the services are not provided to the satisfaction of the Commissioner, North DMC, within the period as mentioned in condition No. iii above.
(v) The applicant would be allowed to develop the site including laying of services and to carry out construction of bldg. simultaneously. The security as guarantee shall only be released after it has been verified by Building Deptt/Services Deptt. that entire development work and laying services has been completed as per approved layout plan /services plan. The completion certificate shall also be issued only after confirming that development work and laying of services has been carried out as per approved layout plan /services plans.
(vi) The applicant shall hand over the area affected under road widening, if any, free of cost to the North DMC, and shall submit an undertaking to this effect.
(vii) The applicant shall demolish /remove all structures not forming part of proposed plan before issue of completion certificate.
(viii) No further sub- division of flats as originally approved for one dwelling unit shall be permitted.
(ix) The land under the scheme shall not be converted into customary plots and no portion of land in the group housing scheme can be sold out at any stage.
(x) The applicant shall comply with all conditions of approval of services plans.
(xi) Applicants shall indemnify North DMC through an Indemnity Bond keeping it harmless in case of any dispute if arises at any stage with respect to the shapes, size extent title/ownership of land.
(xii) Trees, if any affected in the proposal shall not be felled without the permission of Competent Authority.
(xiii) The disposal of dwelling unit meant for EWS shall be as per the as per the provisions of MPD-2021.
(xiv) Clearance of Environment Committee shall be obtained at the time of sanction of building plan.
(xv) The applicant shall file an undertaking stating that no equity shall be claimed by them if ultimately it is found that MPD-2021 suffers from infirmity and demolition of unauthorized and for permissible construction is to be made, the same shall be carried out and the North DMC shall not responsible for any loss / damage as a result of granting the aforesaid sanction.
(xvi) The applicant/developer shall deposit the levy on additional FAR at the rates notified with approval of Govt. from time to time at the time sanction of building plans.
(xvii) All clearance / NOC from external agencies shall be obtained by the Bldg. Deptt., HQ as per the Circulars of EODB at the time of sanction of Building plan.
(xviii) The applicant shall provide toilet blocks and area for solid waste management for Swatch Bharat as per UBBL- 2016.
(xix) The condition imposed by the Hon'ble NGT shall be adhered to by the applicant.
(xx) Any misuse carried out by the applicant is liable to be municipalized/ taken over by the Local body/Authority.
(xxi) All the earlier conditions whichever applicable shall be adhere to the applicant.

Architects:
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MEP:
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Job Title:
REVISED LAYOUT FOR GROUP HOUSING PROJECT AT 1,3 CAVALRY LANE & 4 CHHATRA MARG NEAR VISHWAVIDYALAYA METRO STATION NEW DELHI - 110007

Architect's Signature
Bhupinder Prabhakar, Architect Council of Architects Registration No. CA/2002/23457

Owners' Signature

Drawing Title
LAYOUT PLAN

Job No.	Drawing Released For :			Drawing No.
2014/01	PRELIMINARY ☐	AUTHORITY APPROVAL ■	IFC ☐	AR-MP-01
Drawn	Checked	Approved		
Date 21.09.2020	Scale AS/MENTIONED			

Area Chart Summary								
		PERMISSIBLE				ACHIEVED		
	Site Area	20000	SQM	2Ha	4.94 Acres			
(A)	Permissible FAR (Main FAR)	200		40000	sqm	39997.88	sqm	199.99
	EWS requirement	15% of FAR (min)		6000	sqm	9478.24	sqm	23.70%
	Permissible Ground Coverage (Max.)	33.3%		6660	sqm	2943.80	sqm	14.7%
					Area of Podium	5771.13	sqm	28.9%
					Ground Cover including Podium	8714.93	sqm	43.6%

Area free of FAR				
	Other Buildings			
	Area for Community Building	400	sqm	The Total Built up area for Community & Sports Facility Building including changing rooms acheived is 1709.12 sqm. Apart from the 500 sqm free FAR, an area of 1209.12 sqm has been taken from main FAR and added to this block.
	Area for Sports Facility	100	sqm	
(B)	Total	500	sqm	
TOTAL PERMISSIBLE BUILDABLE FAR (A+B)		40500	sqm	40497.88 sqm

POPULATION STATEMENT			
UNIT TYPE	NO. OF UNITS	PERSONS/ UNIT	NO. OF PERSONS
MAIN DWELLING UNITS	222	4.5	999
EWS	224	2.5	560
TOTAL	446		1559
Density (Upper Limit) (as per MoUD notification dated 13.05.2013)	200 DU/ Ha or 900 PPH		111DU/ Ha or 500 PPH

SHOP AREAS				
SHOPS		AREA OF EACH SHOP	AREA OF SHOPS	HEIGHT
Shop 1&4	2 shops	18.5	37	3.85 m
Shop 2&3	2 shops	19.48	38.96	
Shop 5&8	2 shops	19.69	39.38	4.8 m
Shop 6&7	2 shops	18.65	37.3	
Shop 9	1 shop	15.97	15.97	
Shop 10&11	2 shops	19.19	38.38	
Shop 12	1 shop	16.98	16.98	
Shop 13&16	2 shops	18.5	37	4.8 m
Shop 14&15	2 shops	19.31	38.62	
TOTAL AREA			299.59	SQM

PROJECT DETAILS		
TOTAL SITE AREA	20000	SQM
PROPOSED GROUND COVERAGE	2943.80	SQM
PROPOSED FAR inc. EWS	49976.12	SQM
PROPOSED DENSITY	111DUs/ Ha	
PROPOSED GREEN AREA	3798.75	SQM
PROPOSED ROAD AREA	6571.29	SQM
PROPOSED PARKING	860	Nos.

GREEN AREA CALCULATION (SQM)			
PERMISSIBLE		ACHIEVED	
(50% of Plot Area- Permissible Ground Coverage)		Green	3528.84
10000-6660 =	3340	Water Body	269.91
		Total	3798.75

"This is to certify that the layout plan/ Present is the elevation of the standing elevation contained in its file no. 31 Dated 19/08/2020 subject to the conditions laid down in the said decision"
Chief Town Planner North DMC
Addl. Commissioner (Engg.) North DMC
Municipal Secretary North DMC

BASEMENT AREAS									
	TOTAL BASEMENT AREA SERVICES		SERVICE AREA		SERVICE AREA PERCENTAGE	TOTAL PARKING AREA		PARKING ACHIEVED	
UPPER BASEMENT	14794.21	SQM	2250	SQM	15.2%	12544.21	SQM	187	ECS
LOWER BASEMENT	15687.7	SQM	2250	SQM	14.3%	13437.7	SQM	180	ECS
TOTAL	30481.91	SQM	4500	SQM		25981.91	SQM	367	ECS

Parking Calculation Summary					
	REQUIRED IN NOS.		ACHIEVED IN NOS.		TOTAL
Parking required @ 2 ECS per 100 sqm FAR (as per MOUD Notification dated 23.09.2013)	810	Podium - 1	Single Car Parks	101	235
			Stack Car Parks	124	
			Accessible Car Parks	10	
Parking required @ 0.5 ECS per 100 sqm FAR for EWS (as per MOUD Notification dated 23.09.2013)	48				
Total Parking	858	Podium – 2	Single Car Parks	56	246
			Stack Car Parks	190	
		Stilt above Podium – 2	Stack Car Parks	12	12
		Upper Basement	Single Car Parks	174	187
			Accessible Car Parks	13	
		Lower Basement	Single Car Parks	180	180
		TOTAL			860

NOTE 1: The Height of the Podium & Stilt Floor is considered as per Clause no. - 7.15.2 of UBBL 2016. Since stack Parking Provision is planned on these Floors.

Heights considered:		Area:		
Podium level 1	= 4.2 M (Floor to Floor)	Podium level 1 (inc. staircases)		= 8347.10 sqm
Podium level 2	= 4.8 M (Floor to Floor)	Podium level 2 (inc. staircases)		= 7734.10 sqm
Stilt level	= 3.9 M (Floor to Floor)	Area Above Podium level 2	Open Podium area	= 5771.13 sqm
			Stilt area under Tower A,B & C	= 1072.18 sqm

NOTE 2: As per New Unified Building Bye-Laws for Delhi,2016 (vide DDA Notfn.No.S.O.1191 (E), dt. 22.03.2016, Clause 8.4.7 (b), Ramp may be provided in Setback area.
NOTE 3: As per New Unified Building Bye-Laws for Delhi,2016 (vide DDA Notfn.No.S.O.1191 (E), dt. 22.03.2016, Clause 8.10 (m), Podium shall be free of FAR & Ground Coverage calculations.
NOTE 4: The area for solid waste management is provided in upper basement as per UBBL-2016 .
NOTE 5: The Accessible car Parking Provision is done as per Clause no. - 11.4.2 of UBBL 2016.
NOTE 6: The corresponding recent modifications in UBBL 2016 vide notification S. No. 668 (E) dated 12.02.2020 are incorporated in our revised layout.



LOCATION PLAN

FAR CALCULATION in SQM																				
Tower Type		Description	No. of Floors								Tower Height in mm*		Total No. of DU	Ground Coverage	Area at Podium-1 (Ground Floor Plan)		Area at Podium-2 (First Floor Plan)		Area at Stilt LVL (Above Podium-2)		Area at Typical Level	Area at Lower Pent House Level	Area at Upper Pent House Level	Total Area of Tower
			Podium-1 (Ground Floor)	Podium-2 (First Floor)	Stilt (Above Podium-2)	Fire check Floor	Typical Floors	Pent House		Total Floors	Terrace Level	Building Top Level			FAR		FAR		FAR		FAR	FAR	FAR	FAR
								Lower LVL	Upper LVL															
A	2 DU per floor	4 BHK- Dwelling Unit	P1	P2	ST	2FCH	36	1	1	43	145300	157800	74	445.59	-		-				391.02	382.54	310.78	14770.04
B	2 DU per floor	3 BHK- Dwelling Unit	P1	P2	ST	2FCH	36	1	1	43	145300	157800	74	371.61	-		-				317.05	308.57	286.99	12009.36
C	2 DU per floor	3 BHK- Dwelling Unit	P1	P2	ST	2FCH	36	1	1	43	145300	157800	74	371.61	-		-				317.05	308.57	286.99	12009.36
D	Community Facilities	400 sqm + 100 sqm (Sports Facility) Free of FAR	2 LVL ABOVE PODIUM							-	19050	26050	-	1279.57	-		-		Community Lvl-1	1026.39	-	-	-	1709.12
																			Community Lvl-2	682.73				
										TOTAL NO. OF DWELLING UNITS			222											40497.88
EWS (inc. shops at Ground Floor lvl)	8 DU per floor	1 BHK- Dwelling Unit	G	-	-	1FCH	28			30	99250	111750	224	475.42	Shops area	299.56	-		-		327.81	-	-	9478.24
	16 Shops at Ground Lvl	32.43 (Carpet Area)																						
										TOTAL NO. OF DWELLING UNITS			446	2943.80							TOTAL AREA ACHIEVED			49976.12

External road level (MSL +100.00m) as shown towards Cavalry lane is considered to be ± 0.0m for this project.
*Tower Heights are considered from External Road level.

NORTH DELHI MUNICIPAL CORPORATION
Town Planning Department
E-Block, 13th Floor Civic Centre Minto Road,
Jawaharlal Nehru Marg Delhi-02

No: TP/GT/847

Dated 18/09/2020

To,

M/S Young Builders (P) Ltd.
13, Babar Road, Bengali market,
New Delhi-110001

Sub :-Revised Layout Plan for Group Housing at Vishwavidyalav Metro Station, Civil Lines, Delhi.

Madam,

Kindly refer to your correspondence with this office on the above cited subject. I am directed to inform you that the Standing Committee of the North Delhi Municipal Corporation vide Resolution No.31 dated 19..08.2020 has approved the above layout plan subject to clearance of municipal dues, and other conditions written below

You are requested to submit a Lenin Tracing R.T.F, soft copy in CD and 9 copies of the layout plan with conditions of approval incorporated thereon along with indemnity on Rs.100/- stamp paper for the purpose of authentication. Also please submit an undertaking to abide by the conditions of approval as per Performa enclosed on Rs.10/- Non – judicial stamp paper attested by the Notary Public with Rs.3/- stamp.

Asst. Town Planner-I

(Conditions of approval are as under)

Conditions of Approval-

(i) The applicant shall get the building plans approved form Building. Deptt. of North DMC as per approved layout plan / regulations of Master Plan / Zonal Plan and UBBL - 2016.

(ii) The applicant shall deposit a security amount @ Rs. 5/-per sq.yd of the gross area of plot under the scheme within 15 days of having been intimated of the approval of the layout plan, as a guarantee and laying of services including roads and parking as per the approved layout plan failing which the approval shall not be considered as valid.

(iii) The applicant shall get the services plans approved from respective Services Deptt. before the sanction of building plans and shall lay and maintain the services including roads, parking, landscaping as per approved layout plan / landscape plans / services plans and standard cross sections and other regulations of North DMC to the complete satisfaction of Commissioner, North DMC within period of one year from the date of the approval of layout /services plans, whichever is later , failing which the sanction shall be lapsed. However, a further period of one year may be permitted for development work by the Commissioner, North DMC for the reasons to be recorded.

(iv) The Commissioner, North DMC shall have the right to forfeit a part or whole of the security amount in case the services are not provided to the satisfaction of the Commissioner, North

(v) The applicant would be allowed to develop the land [illegible] out construction of bldg. simultaneously. The security as guarantee shall only be released after it has been verified by Building Deptt/Services Deptt. that entire development work and laying services has been completed as per approved layout plan /services plan. The completion certificate shall also be issued only after confirming that development work and laying of services has been carried out as per approved layout plan /services plans.

(vi) The applicant shall hand over the area affected under road widening, if any, free of cost to the North DMC, and shall submit an undertaking to this effect.

(vii) The applicant shall demolish /remove all structures not forming part of proposed plan before issue of completion certificate.

(viii) No further sub- division of flats as originally approved for one dwelling unit shall be permitted.

(ix) The land under the scheme shall not be converted into customary plots and no portion of land in the group housing scheme can be sold out at any stage.

(x) The applicant shall comply with all conditions of approval of services plans.

(xi) Applicants shall indemnify North DMC through an Indemnity Bond keeping it harmless in case of any dispute if arises at any stage with respect to the shapes, size extent title/ownership of land.

(xii) Trees, if any affected in the proposal shall not be felled without the permission of Competent Authority.

(xiii) The disposal of dwelling unit meant for EWS shall be as per the as per the provisions of MPD-2021.

(xiv) Clearance of Environment Committee shall be obtained at the time of sanction of building plan.

(xv) The applicant shall file an undertaking stating that no equity shall be claimed by them if ultimately it is found that MPD-2021 suffers from infirmity and demolition of unauthorized and for permissible construction is to be made, the same shall be carried out and the North DMC shall not responsible for any loss / damage as a result of granting the aforesaid sanction.

(xvi) The applicant/developer shall deposit the levy on additional FAR at the rates notified with approval of Govt. from time to time at the time sanction of building plans.

(xvii) All clearance / NOC from external agencies shall be obtained by the Bldg. Deptt., HQ as per the Circulars of EODR at the time of sanction of Building plan.

(xviii) The applicant shall provide toilet blocks and area for solid waste management for Swatch Bharat as per UBBL- 2016.

(xix) The condition imposed by the Hon'ble NGT shall be adhered to by the applicant.

(xx) Any misuse carried out by the applicant is liable to be municipalized/ taken over by the Local body/Authority.

(xxi) All the earlier conditions whichever applicable shall be adhere to the applicant.

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REVISED LAYOUT PLAN OF NORTH CAMPUS, DELHI UNIVERSITY

KEY PLAN

DELHI UNIVERSITY CAMPUS

NORTH

SCHOOL OF PLANNING AND ARCHITECTURE

FORM- I

(I) Basic Information

S. No.	Item	Details
1.	Name of the project/s	Amendment in EC of Group Housing Complex
2.	S. No. in the schedule	8 (a) Building and Construction
3.	Proposed capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled	Plot Area = 20,000m^2 Built Up Area (EC Accorded) =70,265.95m^2 Built Up Area (EC Accorded+ Amended Area) = 1,17,733.81m^2
4.	New/Expansion/Modernization	Amendment in Environment Clearance
5.	Existing Capacity/Area etc.	Built Up Area 70,265.95m^2 as per **EC letter no DPCC/SEAC/50/SEIAA/1/2012 dated 13th August, 2012. Construction not started at site.**
6.	Category of Project i.e. 'A' or 'B'	Category B
7.	Does it attract the general condition? If yes, please specify.	No
8.	Does it attract the specific condition? If yes, please specify.	No
9.	Location Plot/Survey/Khasra No. Village Tehsil District State	 1 &3 Cavalry Lane & 4, Chhatra Marg at Civil Lines, NA North Delhi North Delhi Delhi
10.	Nearest railway station/airport along with distance in kms.	**Nearest Railway Station:** The nearest railway station is Old Delhi Railway Station at a distance of 4.0 km in SSE. **Nearest Airport:** The nearest airport is Indira Gandhi International Airport, approx. at a distance of 19.0 km in SW direction. **(Source of information:- Google Image)**
11.	Nearest Town, city, District Headquarters along with distance in	North Delhi (Project located in Delhi)

	kms.	
12.	Village Panchayats, Zilla Parishad, Municipal Corporation, Local body (complete postal addresses with telephone nos. to be given)	MCD North Zone Delhi
13.	Name of applicant	M/s Young Builders (P) Ltd.
14.	Registered Address	10A, Scindia House, Connaught Circus, New Delhi-110001
15.	Address for correspondence : Name Designation (Owner/Partner/CEO) Address Pin Code Telephone No. E-mail	 Mr. Rajiv Ranjan Sharma Vice President 43, Babar Road, Bengali Market, New Delhi 110001 Email: rajivranjan@youngbuilders.in Mobile:+91-9711733602
16.	Details of Alternative Sites examined, if any. Location of these sites should be shown on a toposheet.	Details for the alternative sites are not required as the land purchased by Delhi Metro Rail Corporation Limited for Group Housing Complex.
17.	Interlinked Projects	No
18.	Whether separate application of interlinked project has been submitted?	Not Applicable
19.	If yes, date of submission	Not Applicable
20.	If no, reason	Not Applicable
21.	Whether the proposal involves approval/ clearance under: if yes, details of the same and their status to be given. (a)The forest (Conservation) act, 1980? (b) The wildlife (Protection) act, 1972? (C) The C.R.Z Notification, 1991?	No
22.	Whether there is any Government Order/Policy relevant/relating to the site?	None

23.	Forest land involved (hectares)	No
24.	Whether there is any litigation pending against the project and /or land in which the project is propose to be set up? (a) Name of the Court (b) Case No. (c) Orders/directions of the Court, if any and its relevance with the project.	No

(II) Activity

1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities /rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	**No**	Land has been allotted for residential purposes under Master/Development Plan of New Delhi 2021. The development of the project will be in accordance with development plan of the city and there is no change in land use.
1.2	Clearance of existing land, vegetation and buildings?	**No**	The construction of project does not require any clearance of existing Land, Vegetation & Building.
1.3	Creation of new land uses?	**No**	Land has been earmarked for development of residential facilities as per Master Plan of Delhi 2021, so there will be no creation of new land use.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	**Yes**	Geotechnical study for soil has been done for the project.
1.5	Construction works?	**Yes**	All construction activities will be confined within the project premises; there will be no physical changes outside the project boundary.

1.6	Demolition works?	**No**	Project site is vacant land. Demolition is not required.
1.7	Temporary sites used for construction works or housing of construction workers?	**Yes**	All the construction activity including stocking of raw materials will be confined within the project site only. Temporary labour hutments are proposed. Local labours from nearby area will be hired. Sanitation facilities will be developed at site.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations	**Yes**	Excavation will be carried out for foundation of buildings and basements. The excavated soil will be used in backfilling and other area development activities.
1.9	Underground works including mining or tunneling?	**No**	No underground works including mining/ tunneling is required except excavation of earth.
1.10	Reclamation works?	**No**	No reclamation work required.
1.11	Dredging?	**No**	No dredging required.
1.12	Offshore structures?	**No**	No offshore structures required.
1.13	Production and manufacturing processes?	**No**	No production/manufacturing process is involved as the project is a residential complex.
1.14	Facilities for storage of goods or materials?	**Yes**	Raw material will be stored at site in a covered area. Cement will be separately stored under cover in bales. Sand will be stacked neatly under tarpaulin cover. Bricks and steel will be laid in open.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	**Yes**	**Solid Waste:** The solid waste generated from the project will be in the form of: **Construction Waste:** Left over cement and mortars, cement concrete blocks, aggregate, sand and other inorganic material will be recycled and reused as granular subbase (GSB)

			layer of pavement. **Operational Phase:** Total solid wastes generated including landscape wastes will be 840 kg/day. Solid wastes generated will be segregated into biodegradable (waste vegetables and foods etc.) and non-biodegradable (papers, cartons, thermocol, plastics, glass etc.) components and collected in separate bins. The biodegradable organic wastes will be treated inside the premises by organic waste converter. Recyclable and non-recyclable wastes will be disposed through Govt. approved agency. **Liquid effluents:** During construction phase, sewage will be treated and disposed through septic tanks with soak pits. The waste water in operation phase will be treated up to tertiary level in a STP of 200 KLD capacity and the treated sewage will be reused for toilet flushing and horticulture. The surplus treated water (77 KLD during dry season and 87 KLD during monsoon season) will be discharged to the Sewer. Dewatered/dried sludge generated from the STP plant will be used as manure for green belt development.
1.16	Facilities for long term housing of operational workers?	**No**	Local labourers will be hired from nearby areas during construction phase. So, there will be no need to create permanent facilities for long-term housing of operational workers.
1.17	New road, rail or sea traffic during construction or operation?	**No**	The project site is located to the NH 1. Only internal roads; paths will be developed for vehicular movements for transportation of construction material during construction phase whereas internal tracks and paths will be

			developed for traffic circulation (to avoid any congestion) during operational phase.
1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	**No**	The project site is in close proximity to the NH-1. The nearest railway station is Old Delhi Railway Station at a distance of 4.0 km in SE. The nearest airport is IGI, approximately at a distance of 19.0 km in SSE direction.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	**No**	Since the site is adjacent to Sector Road which has low traffic density, there will be no need for diversion or closure of existing traffic routes.
1.20	New or diverted transmission lines or pipelines?	**No**	There will not be any new/diverted transmission lines or pipelines around the project.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	**No**	No impoundment, damming, culverting, realignment or other changes to the hydrology of surface watercourses is proposed.
1.22	Stream crossings?	**No**	There are no streams running across the site.
1.23	Abstraction or transfers of water form ground or surface waters?	**Yes**	During construction phase, 589 ML of water will be required which will be met supplied through private water tankers. During operation phase, water will be provided by Delhi Jal Board. About 224 KLD of fresh water will be required during operation phase of the project.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	**No**	Runoff will increase due to increased paved surface. However, increased runoff will be managed by well-designed rainwater harvesting system and storm water management plan.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	**Yes**	During the construction phase, about 15-20 trucks are estimated per week. Adequate parking space within the project site for loading and unloading of materials will be provided. Adequate parking space (854 ECS) will

			be provided for operational phase to the residents and commercial occupants of the premises.
1.26	Long-term dismantling or decommissioning or restoration works?	**No**	No Long term dismantling or decommissioning or restoration works will be involved.
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	**No**	None
1.28	Influx of people to an area in either temporarily or permanently?	**No**	Local laborers from nearby area will be employed during the construction phase. In the operation phase, most of the expected occupants will be from the surrounding areas. Hence, the project will lead to a redistribution of occupants within the city. Thus, no significant influx of people is envisaged.
1.29	Introduction of alien species?	No	The landscaping will be carried out with mainly local species of flora that are well suited to the local conditions.
1.30	Loss of native species or genetic diversity?	No	There will be no significant impact on the native species or genetic diversity.
1.31	Any other actions?	No	Not Applicable.

2. Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):

S. No.	Information/checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
2.1	Land especially undeveloped or agricultural land (ha)	**No**	The residential project is as per the designated landuse under Master/ Development Plan of Delhi, 2021.
2.2	Water (expected source & competing users) unit: KLD	**Yes**	During construction phase, 589 ML of water will be required which will be supplied through private water tankers. During operation phase, water will be provided by Delhi Jal Board. About 224 KLD of fresh water will be required during operation phase of the project.

2.3	Minerals (MT)	**Yes**	Minerals such as sand and aggregates will be required during the construction phase.
2.4	Construction material – stone, aggregates, and / soil (expected source – MT)	**Yes**	All materials for construction will be arranged through select suppliers.
2.5	Forests and timber (source – MT)	**Yes**	All material forests and timber will be provided by selected suppliers. However steel frames etc shall be used to minimize the use of timber.
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	**Yes**	The total demand load is estimated at 2808 KW. Power will be supplied by North Delhi Power Limited (NDPL). Power backup for the Group Housing Complex will be through 3 number of DG sets of total capacity of 4500 kVA (i.e. 3x1500 kVA each). Out of 3 DG Sets 1 will remain on standby mode.
2.7	Any other natural resources (use appropriate standard units)	**No**	Not Applicable

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	**Yes**	Diesel for DG sets will be stored in drums in earmarked locations. It shall also be handled as per The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 and Material Safety Data Sheet. Used oil of DG sets will be given to authorized dealers approved by CPCB/MoEF for Hazardous Waste Handling.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	**No**	Suitable drainage and waste management measures (with frequent spray of insecticides etc.) will be adopted in both the construction and operational phase such that there will be no stagnation of water or accumulation of waste. This will

			effectively restrict the reproduction and growth of disease vectors.
3.3	Affect the welfare of people e.g. by changing living conditions?	**Yes**	Socio-economic standard of people will improve due to increased employment opportunities provided by this project. This will lead to better quality of life and will also set a standard for future developments in the area.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.	**No**	Impacts of this type are not expected.
3.5	Any other causes	**No**	Not Applicable

4. Production of solid wastes during construction or operation or decommissioning (MT/month)

<table>
<tr><th>S. No.</th><th>Information/Checklist confirmation</th><th>Yes/No</th><th>Details thereof (with approximate quantities/rates, wherever possible) with source of information data</th></tr>
<tr><td>4.1</td><td>Spoil, overburden or mine wastes</td><td>No</td><td>No such spoil, overburden or mine wastes will be generated.</td></tr>
<tr><td>4.2</td><td>Municipal waste (domestic and or commercial wastes)</td><td>Yes</td><td>The total municipal (domestic) solid waste to be generated is approx. 840 kg/day.
<table>
<tr><td>Biodegradable waste</td><td>504 kg/day (Waste vegetables and foods etc.)</td></tr>
<tr><td>Non-biodegradable waste</td><td>252 kg/day (Papers, cartons, thermocol, plastics, glass etc.)</td></tr>
<tr><td>Inert waste</td><td>84 kg/day</td></tr>
<tr><td>Total</td><td>840 kg/day</td></tr>
</table></td></tr>
<tr><td>4.3</td><td>Hazardous wastes (as per Hazardous Waste Management Rules)</td><td>Yes</td><td>The hazardous wastes along with other wastes in the project will be used oil from DG sets, which is classified as per The Hazardous Waste Category 5.1 as per The Hazardous Wastes (Management & Handling) Rules, 1989.</td></tr>
</table>

			Used oil from DG sets will be stored in HDPE drums in isolated covered facility. This used oil will be sold to authorized recyclers. Suitable care will be taken so that spills/leaks of used oil from storage is avoided.
4.4	Other industrial process wastes	**No**	Not applicable
4.5	Surplus product	**No**	Not applicable
4.6	Sewage sludge or other sludge from effluent treatment	**Yes**	20 kg/day of Sludge generated from the STP plant will be dried and later will be used as manure for green belt development.
4.7	Construction or demolition wastes	**Yes**	The construction waste will consist of excess earth and construction debris along with cement bags, steel in bits and pieces, insulating and packaging materials etc. Recyclable waste construction materials will be sold to recyclers. Unusable and excess construction debris will be disposed at designated places in tune with the local norms.
4.8	Redundant machinery or equipment	**No**	Redundant machinery will not be generated.
4.9	Contaminated soils or other materials	**No**	Contaminated soils or other materials will not be generated.
4.10	Agricultural wastes	**Yes**	Landscape wastes of 0.17 kg/day will be generated.
4.11	Other solid wastes	**No**	Not Applicable

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr).

S. No.	**Information/Checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities/rates, wherever possible) with source of information data**
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	**Yes**	The project does not envisage any major air pollution sources except operation of DG sets during power failure and vehicular traffic.
5.2	Emissions from production processes	**No**	No production processes involved. Hence, there will be no such emissions.
5.3	Emissions from materials handling including storage or transport	**Yes**	Small quantities of fugitive emissions are envisaged during transport and handling

			of construction materials. Such emissions will be temporary and controlled by the use of sprinkling and other viable techniques like covering of loose material.
5.4	Emissions from construction activities including plant and equipment	**Yes**	This will be restricted to the construction phase and the construction site only.
5.5	Dust or odours from handling of materials including construction materials, sewage and waste	**Yes**	Dust is anticipated during loading and unloading of construction material and excavation of upper earth surface. These will however be temporary in nature, which will be controlled by providing water sprinklers. Tarpaulin cover will be provided on stored loose materials to reduce the dust emission. There is no source of odors in the proposed project.
5.6	Emissions from incineration of waste	**No**	No incineration of wastes is proposed.
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	**No**	Open burning of biomass/other material will be prohibited on site.
5.8	Emissions from any other sources	**No**	Not Applicable

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	**Yes**	Noise Source in the operational phase will be from DG sets (which will be in operation only during power failure) and pumps & motors. All the machinery will be of highest standard of reputed make and will comply with standard i.e. the DG set room will be provided with acoustic enclosure to have minimum 25 dB (A) insertion loss or for meeting the ambient noise standard whichever is on higher side as per E (P) Act, GSR 371 (E) and its amendments. Therefore, no significant impact due to operation of machinery is anticipated.
6.2	From industrial or similar processes	**No**	No industrial processes will be carried out in the project.

6.3	From construction or demolition	**Yes**	Due to various construction activities, there will be short-term noise impacts in the immediate vicinity of the project site. The construction activities will include the following noise generating activities: • Concreting, mixing & operation of DG sets. • Construction plant and heavy vehicle movement.
6.4	From blasting or piling	**No**	No blasting or mechanized piling will be done.
6.5	From construction or operational traffic	**Yes**	Some noise will be generated from vehicular movement in the construction and operational phase but that will be temporary and mitigated with green belt and PUC vehicle will be only operated.
6.6	From lighting or cooling systems	**No**	No significant noise impact will result from lighting or cooling systems.
6.7	From any other sources	**No**	Not Applicable

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	**No**	The used oil from DG sets will be carefully stored in HDPE drums at isolated storage, and periodically sold to authorized recyclers. All precautions will be taken to avoid spillage from storage as per The Hazardous Wastes (Management & Handling) Rules, 1989.
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of Discharge)	**No**	There will be no discharge of untreated sewage on land or into water bodies. Adequate treatment of sewage will be carried out in a STP of capacity 200 KLD, proposed within the project premises. Treated sewage will be re-used for flushing & landscaping and the surplus treated water (77 KLD during dry season and 87 KLD during monsoon season) will be discharged to the sewer. External facility will be provided to

			discharge the excess treated water as per The Water (Prevention and Control of Pollution) Act, 1974.
7.3	By deposition of pollutants emitted to air into the land or into water	**No**	The DG Sets will be provided with stacks of adequate height. Hence dispersion will be achieved and avoid deposition of pollutants in significant concentrations at any single location.
7.4	From any other sources	**No**	Not Applicable
7.5	Is there a risk of long term build up of pollutants in the environment from these sources?	**No**	Not Applicable

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires, etc. from storage, handling, use or production of hazardous substances	**Yes**	To deal with any fire related accident, fire fighting facility of single handed hydrant valve, long hose reel, and portable fire extinguisher shall be provided.
8.2	From any other causes	**No**	Not Applicable
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)	**No**	The project falls under **Seismic Active Zone IV** indicating high damage risk zone. The buildings will be designed as earthquake resistant and comply with the required IS specifications.

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/rates, wherever possible) with source of information data
9.1	Lead to development of supporting. utilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.:	**Yes**	Appropriate infrastructure like roads, power supply, waste management and waste water treatment will be developed within the project site. Development of the area will be as per

	• Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.)		the approved Master/ Development Plan of Delhi, 2021.
	• Housing development	**Yes**	Housing development will take place.
	• Extractive industries	**No**	Not Applicable
	• Supply industries	**No**	Not Applicable
	• Other	**No**	Not Applicable
9.2	Lead to after-use of the site, which could have an impact on the environment	**No**	Not Anticipated
9.3	Set a precedent for later developments	**Yes**	The project will provide good infrastructure and better life style and will set an example for later developments in the areas.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	**No**	Not Applicable

(III) Environmental Sensitivity

S. No.	Areas	Name/ Identity	Aerial distance (within 15 km) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	**Parliament House**	Approx. 8.5 Km. South
		Rashtrapati Bhavan	Approx. 9.0 Km. SSW
		Red Fort	Approx. 5.0 Km SE
		India Gate	Approx. 9.0 Km SSE
		Jama Masjid	Approx. 5.0 Km SSE
		Supreme Court	Approx. 8.5 Km SSE
		Safdarjung Tomb	Approx. 11.5 Km South
		Raj Ghat	Approx. 7.0 Km SE
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone,	**<u>Water Sources</u>**	
		Yamuna River	Approx. 1.5 Km East

	biospheres, mountains, forests	**Najafgarh Drain** **Bhalswa Lake** **<u>Forest</u>** **Northern Ridge Reserve Forest** **Central Ridge Reserved Forest**	Approx. 0.5 Km West Approx. 6.5 Km NW Approx. 0.5 Km East Approx. 6.0 Km SSW
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	**Yamuna Biodiversity Park**	Approx. 4.0 Km North
4	Inland, coastal, marine or underground waters	**None**	--
5	State, National boundaries	**State Boundary-Uttar Pradesh**	Approx. 6.5 Km NE
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	**NH-1** **Old Delhi Railway Station** **IGI Airport**	Approx. 35m North Approx. 4.0 Km SSE Approx. 19.0 Km SW
7	Defense installations	**Delhi Cantt.**	Approx. 12.0 Km SSW
8	Densely populated or built-up area	**Kamla Nagar**	Approx. 1.5 Km SSW
9	Areas occupied by sensitive man-made land uses *(hospitals, schools, places of worship, community facilities)*	**Sant Parmanad Hospital** **North DMC Medical College & Hindu Rao Hospital** **Mahavir Senior Model School** **Arya Samaj Mandir**	Approx. 2.0 Km SE Approx. 2.0 Km South Approx. 2.5 Km WSW Approx. 1.0 Km SE

		Post Office Delhi University	Approx. 0.5 Km SSE
		Axis Bank	Approx. 1.5 Km East
10	Areas containing important, high quality or scarce resources. *(ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)*	**<u>Tourism</u>**	
		Parliament House	Approx. 8.5 Km. South
		Rashtrapati Bhavan	Approx. 9.0 Km. SSW
		Red Fort	Approx. 5.0 Km SE
		India Gate	Approx. 9.0 Km SSE
		Jama Masjid	Approx. 5.0 Km SSE
		Supreme Court	Approx. 8.5 Km SSE
		Safdarjung Tomb	Approx. 11.5 Km South
		Raj Ghat	Approx. 7.0 Km SE
		<u>Forest</u>	
		Northern Ridge Reserve Forest	Approx. 0.5 Km East
		Central Ridge Reserved Forest	Approx. 6.0 Km SSW
11	Areas already subjected to pollution or environmental damage. *(those where existing legal environmental standards are exceeded)*	**None**	--
12	Areas susceptible to natural hazard which could cause the project to present environmental problems (*earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions*)	**Earthquakes**	The site falls under the zone IV as per the Seismic Zone Map of India and is thus prone to high damage risk zone. Adequate measures will be taken during the construction of the project.

Group Housing Project
1 &3 Cavalry Lane & 4, Chhatra Marg at Civil Lines
(Adjoining Vishwa Vidyalaya Metro Station), Delhi ***FORM I***

"I hereby undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance give, if any to the project will be our risk and cost.

Date: 24.01.2018
Place: New Delhi



Signature of the Applicant
Rajiv Ranjan Sharma
Vice President – Projects
43, Babar Road,
New Delhi – 110 001
(Project Proponent/ Authorized Signatory)

NOTE:

1. The Projects involving clearance under Coastal Regulation Zone Notification, 1991 shall submit with the application a C.R.Z map duly demarcated by one of the authorized agencies, showing the project activities, w.r.t. C.R.Z. and the recommendations of the state Coastal Zone management Authority. Simultaneous action shall also be taken to obtain the requisite clearance under the provisions of the C.R.Z. Notification, 1991 for the activities to be located in the CRZ.
2. The projects to be located within 10 km of the National Parks, Sanctuaries, Biosphere Reserves, Migratory Corridors of Wild Animals, the project proponent shall submit the map duly authenticated by Chief Wildlife Warden showing these features vis-à-vis the project location and the recommendations or comments of the Chief Wildlife Warden thereon."
3. All correspondence with the Ministry of Environment & Forests including submission of application for TOR/ Environmental Clearance, subsequent clarifications, as may be required from time to time, participation in the EAC Meeting on behalf of the project proponent shall be made by the authorized signatory only. The authorized signatory should also submit a document in support of his claim of being an authorized signatory for the specific project".

AREA STATEMENT

The total (EC Accorded + Amended) area of project is estimated 20,000m^2 (or 4.94 acres). The detailed Area Statement is provided below in **Table 1.**

Table 1: Area Statement (EC Accorded +Amended Area)

S. No.	PARTICULARS	EC Accorded Area (Sqm.)	Amended Area (Sqm.)	Total Area (EC Accorded + Amended Area) (Sqm.)	Percentage (%)
1.	**Plot Area**	**20,000**			**100**
2.	**Permissible Ground Coverage**	6,666	0	6,666	
3.	**Proposed Ground Coverage**	2,130.64	-249.04	1,881.6	
4.	**Permissible FAR**	46,600	-6,100	40,500	
5.	**Proposed FAR**	**46,156.72 (inc. EWS FAR)**	**-5,658.13**	**40,498.59**	
6.	**Permissible EWS FAR (minimum 15% of FAR, Free from FAR)**	**--**	6,000	6,000	
7.	**Proposed FAR for EWS**	**--**	**8,306.52**	**8,306.52**	
8.	**Non FAR Area** • **Area free of FAR in Towers, Club & EWS inc. Balconies, Mumty, Staircases, Fire Tower, Fire Check Floor, Ground Floor Lobbies etc.**	**--**	**22,874.44**	**22,874.44**	

	• **GF Podium area** • **FF Podium area** • **SF Stilt area**	**--** **--** **586.41**	**6,493.24** **7,210.07** **24.29**	**6,493.24** **7,210.07** **610.7**	
9.	**Lower & Upper Basement Area (Non FAR)**	**23,522.92**	**8,217.34**	**31,740.26**	
10.	**Total Built Up Area**	**70,265.95**	**47,467.86**	**1,17,733.81**	
11.	**Landscape area**	8,373.75	-4,961.78	3,411.97	
12.	**Building Heights (in m) (Building Top level)**	**117**	**22.6**	**139.6**	

***FAR = Floor Area Ratio**

Table 2: Built-up Area Breakup (EC Accorded +Amended Area)

SI. No.	PARTICULARS	EC Accorded Area (Sq. m.)	Amended Area (Sq. m.)	Total Area (EC Accorded + Amended Area) (Sq. m.)
1.	**Proposed FAR**	46,156.72 (inc. FAR of EWS)	-5658.13	40,498.59
2.	**Proposed FAR for EWS**	--	8,306.52	8,306.52
3.	**Non FAR**	586.41	36,602.04	37,188.45
4.	**Lower & Upper Basement Area (Non FAR)**	23,522.92	8,217.34	31,740.26
5.	**Built Up Area**	70,265.95	47,467.86	1,17,733.81

POPULATION DENSITY

The total population for the total project (EC Accorded +Amended) is 1,785 persons.

The detailed population breakup is given below in the following **Table 3 (a, b).**

Table 3(a): Dwelling Units (EC Accorded +Amended)

S. No.	Particular	EC Accorded	Amended	Total
A.	Total Dwelling Unit inc. EWS	324	86	410

Table 3(b): Population Break up (EC Accorded +Amended)

S. No.	Unit Type	Dwelling Units /Area (in m^2)	PPU/ m^2 per person	Total Population
A.	**Residential**	258	4.5	1,161
B.	**EWS**	152	2.5	380
C.	**Staff**		@ 5% residential population	58
D.	**Visitors**		@ 10 % residential population	116
E.	**Shops staff**	15	@ 2 Persons/ Shop	30
F.	**Community**	1	@ 40 Persons/ Building	40
Total Population (A+B+C+D+E+F)				**1,785**

WATER REQUIREMENT

The total water requirement is approx. 224 KLD, out of which total domestic water requirement is 214 KLD. The fresh water requirement is approx. 157 KLD (which is 70% of the domestic water demand). The water will be supplied by Delhi Jal Board. The daily water requirement calculation is given below in **Table 5**:

ANNEXURE-R15

रजिस्ट्री सं० डी० एल०-33004/99

REGD. NO. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

असाधारण
EXTRAORDINARY
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सड़क परिवहन और राजमार्ग मंत्रालय

अधिसूचना

नई दिल्ली, 19 अगस्त, 2015

सा.का.नि. 643(अ).—केन्द्रीय मोटर यान नियम, 1989 की धारा 212 की उपधारा (1) के अधीन अपेक्षानुसार केन्द्रीय मोटर यान नियम, 1989 का और संशोधन करने के लिए, भारत सरकार के सड़क परिवहन और राजमार्ग मंत्रालय की भारत के राजपत्र, असाधारण, भाग 2, खंड 3, उपखंड (i) में प्रकाशित अधिसूचना सा.का.नि. संख्यांक 405(अ) तारीख 19 मई, 2015 द्वारा प्रारूप नियम प्रकाशित किए गए थे, उन सभी व्यक्तियों से, जिनके उनसे प्रभावित होने की संभावना थी, उस तारीख से जिसको उक्त अधिसूचना से युक्त राजपत्र की प्रतियां जनता को उपलब्ध करा दी गई थी तीस दिन की अवधि के अवसान से पूर्व आक्षेप और सुझाव आमंत्रित किए गए थे ;

और उक्त राजपत्र अधिसूचना की प्रतियां जनता को 19 मई, 2015 को उपलब्ध करा दी गई थी ;

और उक्त प्रारूप नियमों की बाबत जनता से प्राप्त आक्षेपों और सुझावों पर केन्द्रीय सरकार द्वारा विचार कर लिया गया है ;

अतः अब केन्द्रीय सरकार, केन्द्रीय मोटर यान अधिनियम, 1988 (1988 का 59) की धारा 110 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, केन्द्रीय मोटर यान नियम, 1989 का और संशोधन करने के लिए निम्नलिखित नियम बनाती है, अर्थात् :-

1. (1) इन नियमों का संक्षिप्त नाम केन्द्रीय मोटर यान (तेरहवां संशोधन) नियम, 2015 है।

(2) ये राजपत्र में उनके प्रकाशन की तारीख को प्रवृत्त होंगे।

2. केन्द्रीय मोटर यान नियम, 1989 के नियम 115 में, -

(क) उपनियम (14) में खंड (छ) में, उपखंड (iii) के पश्चात् निम्नलिखित उपखंड अंतस्थापित किए जाएंगे, अर्थात् :-

"(iv) इस उपनियम के उपबंध 1 अक्तूबर, 2015 से ही विनिर्मित चार पहिया यानों को जम्मू और कश्मीर (लेह और कारगिल जिलों को छोड़कर), पंजाब, हरियाणा, हिमाचल प्रदेश, उत्तराखंड और राजस्थान राज्य के हनुमानगढ़ और श्रीगंगानगर जिलों तथा उत्तर प्रदेश राज्य के सहारनपुर, मुजफ्फरनगर, बिजनौर, ज्योतिबा फुलेनगर, रामपुर, मुरादाबाद, अलीगढ़, बदांयू, बरेली, मथुरा, महामायानगर, एटा, आगरा, फिरोजाबाद, इटावा, मैनपुरी, पीलीभीत, शामली, संभल, फरुखाबाद, कन्नौज, औरैया और कासगंज जिलों को लागू नहीं होंगे।

(v) इस उपनियम के उपबंध 1 अप्रैल, 2016 से ही विनिर्मित चार पहिया यानों को गोवा, केरल, कर्नाटक, तेलंगाना, उड़ीसा राज्यों और दमन और दीव, दादरा नागर हवेली तथा अंडमान और निकोबार संघ राज्यक्षेत्रों तथा महाराष्ट्र राज्य के मुंबई, ठाणे और पुणे जिलों और गुजरात राज्य के सूरत, बलसाड, डांग्स और तापी जिलों को लागू नहीं होंगे।

(vi) इस उपनियम के उपबंध 1 अप्रैल, 2017 से ही विनिर्मित चार पहिया यानों को लागू नहीं होंगे ;" ;

(ख) उपनियम (15) में खंड (क) में तीसरे परंतु के पश्चात् निम्नलिखित परंतुक अंतस्थापित किया जाएगा, अर्थात् :-

"परंतु यह भी कि पूर्वोक्त उपबंधों में अन्तर्विष्ट उपबंधों पर प्रतिकूल प्रभाव डाले बिना वृहत्त उत्सर्जन मानक, भारत स्तर 4 जम्मू और कश्मीर (सिवाय लेह और कारगिल जिलों के) पंजाब, हरियाणा, हिमाचल प्रदेश, उत्तराखंड और राजस्थान राज्य के हनुमानगढ़ और श्रीगंगानगर जिलों तथा उत्तर प्रदेश राज्य के सहारनपुर, मुजफ्फरनगर, बिजनौर, ज्योतिबा फुलेनगर, रामपुर, मुरादाबाद, अलीगढ़, बदांयू, बरेली, मथुरा, महामायानगर, एटा, आगरा, फिरोजाबाद, इटावा, मैनपुरी, पीलीभीत, शामली, संभल, फरुखाबाद, कन्नौज, औरैया और कासगंज जिलों की बाबत 1 अक्तूबर, 2015 को विनिर्मित 4 पहिया यानों के संबंध में सिवाय चार पहिया परिवहन यानों जो अन्तर्राज्जीय अनुज्ञा पत्रों या राष्ट्रीय अनुज्ञा पत्रों या अखिल भारतीय पर्यटक अनुज्ञा पत्रों के अधीन उक्त जिलों और राज्य की अधिकारिता के भीतर प्रचालन कर रहे हैं, लागू होंगे :

परंतु यह भी कि पूर्वोक्त परंतुकों में के उपबंधों में अन्तर्विष्ट उपबंधों पर प्रतिकूल प्रभाव डाले बिना, वृहत्त उत्सर्जन मानक, भारत स्तर 4 गोवा, केरल, कर्नाटक, तेलंगाना, उड़ीसा, राज्यों और दमन और दीव, दादरा नागर हवेली तथा अंडमान और निकोबार संघ राज्य क्षेत्रों तथा महाराष्ट्र राज्य के मुंबई, ठाणे और पुणे जिलों और गुजरात राज्य के सूरत, बलसांड, डांग्स और तापी जिलों के संबंध में 1 अप्रैल, 2016 से ही विनिर्मित चार पहिया यानों के संबंध में सिवाय चार पहिया परिवहन यानों जो अन्तर्राज्जीय अनुज्ञा पत्रों या राष्ट्रीय अनुज्ञा पत्रों या अखिल भारतीय पर्यटक अनुज्ञा पत्रों के अधीन उक्त जिलों और राज्य की अधिकारिता के भीतर प्रचालन कर रहे हैं, लागू होंगे ;" ;

(ग) उपनियम (15) में खंड (क) के पश्चात् निम्नलिखित खंड अंत:स्थापित किया जाएगा, अर्थात् :-

"(कक) खंड (क) में निर्दिष्ट परंतुकों में अंतर्विष्ट उपबंधों पर प्रतिकूल प्रभाव डाले बिना भारत स्तर 4 के लिए वृहत्त उत्सर्जन मानक 1 अप्रैल, 2017 को या उसके पश्चात्त विनिर्मित चार पहिया यानों के संबंध में संपूर्ण देश में लागू होंगे ;" ;

[फा. सं. आरटी-11011/05/2011-एमवीएल]

संजय बंदोपाध्याय, संयुक्त सचिव

टिप्पण : मूल नियम भारत के राजपत्र, असाधारण, भाग 2, खंड 3, उपखंड (i) में अधिसूचना सं. सा.का.नि. 590(अ), तारीख 2 जून, 1989 द्वारा प्रकाशित किए गए थे और अंतिम संशोधन सा.का.नि. सं. 555(अ), तारीख 14/07/2015 द्वारा किया गया।

MINISTRY OF ROAD TRANSPORT AND HIGHWAYS

NOTIFICATION

New Delhi, the 19th August, 2015

G.S.R. 643(E).— Whereas the draft rules further to amend the Central Motor Vehicles Rules, 1989, were published, as required under sub-section (1) of section 212 of the Motor Vehicles Act, 1988 (59 of 1988), *vide* notification of the Government of India in the Ministry of Road Transport and Highways number G.S.R. 405 (E), dated the 19th May, 2015, in the Gazette of India, Extraordinary, Part-II, section 3, sub-section (i) inviting objections and suggestions from all persons likely to be affected thereby before the expiry of the period of thirty days from the date on which copies of the Gazette containing the said notification were made available to public;

And whereas, copies of the said Gazette notification were made available to the public on the 19th May, 2015;

And whereas, the objections and suggestions received from the public in respect of the said draft rules have been considered by the Central Government;

Now, therefore, in exercise of the powers conferred by section 110 of the Motor Vehicles Act, 1988 (59 of 1988), the Central Government hereby makes the following rules further to amend the Central Motor Vehicles Rules, 1989, namely:—

1. (1) These rules may be called the Central Motor Vehicles (Thirteenth Amendment) Rules, 2015.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Central Motor Vehicle Rules, 1989, in rule 115,-

(a) in sub-rule (14), in clause (G), after sub-clause (iii), the following sub-clauses shall be inserted, namely:-

"(iv) the provisions of this sub-rule in respect of four wheeler vehicles manufactured on and from the 1st October, 2015 shall not apply to the States of Jammu and Kashmir (except Districts of Leh and Kargil), Punjab, Haryana, Himachal Pradesh, Uttarakhand, and districts of Hanumangarh and Sri Ganganagar in the State of Rajasthan and in the districts of Saharanpur, Muzaffarnagar, Bijnaur, Jyotiba Phule Nagar, Rampur, Muradabad, Aligarh, Badaun, Bareilly, Mathura, Mahamayanagar, Etah, Agra, Firozabad, Etawah, Mainpuri, Pilibhit, Shamli, Sambhal, Farrukabad, Kannauj, Auriya and Kasganj in the State of Uttar Pradesh;

(v) the provisions of this sub-rule in respect of four-wheeled vehicles manufactured on and from 1st April, 2016 shall not apply to the States of Goa, Kerala, Karnataka, Telangana, Odisha and the Union territories of Daman and Diu, Dadra and Nagar Haveli and Andaman and Nicobar Islands, districts of Mumbai, Thane and Pune in the State of Maharashtra and districts of Surat, Valsad, Dangs and Tapi in the State of Gujarat;

(vi) the provisions of this sub-rule in respect of four-wheeled vehicles manufactured on and from 1st April, 2017 shall not be applicable.";

(b) in sub-rule (15), in clause (a), after the third proviso, the following provisos shall be inserted, namely:-

"Provided also that, without prejudice to the provisions contained in the above provisos, the Mass Emission Standards, Bharat Stage IV, shall be applicable to the States of Jammu and Kashmir (except districts of Leh and Kargil), Punjab, Haryana, Himachal Pradesh, Uttarakhand and districts of Hanumangarh and Sri Ganganagar in the State of Rajasthan and districts of Saharanpur, Muzaffarnagar, Bijnaur, Jyotiba Phule Nagar, Rampur, Moradabad, Aligarh, Badaun, Bareilly, Mathura, Mahamayanagar, Etah, Agra, Firozabad, Etawah, Mainpuri, Pilibhit, Shamli, Sambhal, Farrukabad, Kannauj, Auriya and Kasganj in the State of Uttar Pradesh in respect of four wheeled vehicles manufactured on or after the 1st October, 2015, except the four wheeled transport vehicle plying on Inter-State Permits or National Permits or All India Tourist Permits, within the jurisdiction of said district and States:

Provided also that, without prejudice to the provisions contained in the above provisos, the Mass Emission Standards, Bharat Stage IV, shall be applicable in the States of Goa, Kerala, Karnataka, Telangana, Odisha and the Union territories of Daman and Diu, Dadra and Nagar Haveli and Andaman and Nicobar Islands, districts of Mumbai, Thane and Pune in the State of Maharashtra and districts of Surat, Valsad, Dangs and Tapi in the State of Gujarat, in respect of four-wheeled vehicles manufactured on or after the 1st April, 2016, except the four wheeled transport vehicle plying

on Inter-State Permits or National Permits or All India Tourist Permits, within the jurisdiction of the said district and States;";

(c) in sub-rule (15), after clause (a), the following clause shall be inserted namely:—

" (aa) without prejudice to the provisions contained in the provisos to clause (a), the Mass Emission Standards for Bharat Stage IV shall come into force all over the country in respect of four wheeled vehicles manufactured on or after the 1st April, 2017;".

[F. No. RT-11011/05/2011-MVL]

SANJAY BANDOPADHYAYA, Jt. Secy.

Note : The principal rules were published in the Gazette of India, Extraordinary, Part-II, section 3, sub-section (i) vide notification number G.S.R. 590(E), dated the 2nd June, 1989 and lastly amended vide notification number G.S.R. 555(E) dated 14/7/15.

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INDIAN EMISSIONS REGULATIONS

Limits, Regulations, Measurement of Exhaust Emissions and Calculation of Fuel Consumption

ANNEXURE-R16

1150 ARAI YEARS OF BUILDING AUTOMOTIVE EXCELLENCE 1966 - 2016



ARAI® Progress through Research

The Automotive Research Association of India

With Best Compliments from :
Mrs. Rashmi Urdhwareshe
Director - ARAI

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The content of this booklet represents the status of information at the time of print.

It does not replace the need to always refer official regulation and it is subject to change.

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November 2018

The Emission Standards for Bharat Stage-VI (BS VI)

for 2 wheeler vehicle models manufactured on 1st April 2020 as per GSR 889(E) dt.16th Sept 2016

Limit Values for 2 wheelers fitted with PI & CI engines: BSVI

	Vehicle Class	BS VI Emission Norms							
		CO mg/km	HC mg/km	NOx mg/km	NMHC mg/km	PM mg/km	EVAP mg/test	OBD	Durability mileage (km) Type V
PI Vehicles	1 & 2-1	1000	100	60	68	4.5*	1500	STAGE I & STAGE II***	20000
	2-2	1000	100	60	68	4.5*			
	3-1 & 3-2	1000	100	60	68	4.5*			35000
CI Vehicles	All	500	100	90	68	4.5*	-		35000
	DF (for all classes)	1.3	1.3 (SI) 1.1 (CI)	1.3 (SI) 1.1 (CI)	1.3 (SI) 1.1 (CI)	1.0 (CI)	300**	-	-

Mass Emission Standards (Bharat Stage VI) for 2 wheelers with Spark Ignition engines
(Vehicles with cc ≤ 50 and Vmax ≤ 50 km/hr)

Pollutant	TA=COP norms mg/km	Deterioration Factor (D.F.)	Test Cycle (Cold Start at T=0 sec)
CO	500	1.2	IDC as per AIS137
HC	350	1.2	
NOx	150	1.2	

* Applicable to gasoline direct injection (DI) engines only.

**Fixed DF of 300 mg/test shall be added to SHED test results. Alternative to fixed DF, manufacture may opt for ageing of evaporative emission control devices as per procedure specified in AIS 137 and as amended time to time.

*** OBD STAGE II will be applicable from 1st April 2023

PI= Positive Ignition CI= Compression Ignition

Applicability of Test Requirements for Type-Approval: BS VI

	Vehicle with SI engines including hybrids									Vehicles with CI engines including hybrids		
	Mono-fuel					Bi-fuel(3)			Flex-fuel	Flex-fuel	Mono-fuel	Dual Fuel
	Gasoline (E5)	LPG	CNG / Bio methane/ Bio-Gas/ LNG	H_2	HCNG (Hydrogen + CNG)	Gasoline (E5) LPG	Gasoline (E5) CNG/ Bio methane	Gasoline (E5) H_2	Gasoline (E5) Ethanol (E85)/ E100	Diesel (B7) Up to 100% (1)Biodiesel	Diesel (B7)	Diesel + CNG
Gaseous pollutant Type I test	Yes	Yes	Yes	Yes	Yes	Yes (both fuels)	Yes (both fuels)	Yes (Both fuels)	Yes (both fuels)	Yes (Both fuels)	Yes	Yes
(2) Type I test Particulate mass	Yes	No	No	No	No	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes	Yes	Yes
Idle emission (Type II)	Yes	Yes	Yes	Yes	Yes	Yes (both fuels)	Yes (both fuels)	Yes (gasoline only)	Yes (both fuels)	No	No	No
Crankcase emission (Type III test)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Evaporative emission (Type IV test)	Yes	No	No	No	No	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	No	No	No

continued...

Durability (Type V test)	Yes	Yes	Yes	Yes	Yes	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (B 7 Only)	Yes	Yes
[4]CO_2 & Fuel consumption	Yes	Yes	Yes	Yes	Yes	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes	Yes
On board diagnosis OBD	Yes	Yes	Yes	Yes	Yes	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (B 7 Only)	Yes	Yes
Smoke Opacity	No	No	No	No	No	No	No	No	No	Yes (B 7 Only)	Yes	No

[1] Vehicles fuelled with bio diesel blends up to 7% shall be tested with reference diesel (B7) and vehicles fuelled with Bio diesel blends above 7% will be tested with respective blends.

[2] In case of PI engines, applicable only to vehicles with direct Injection engines.

[3] Vehicle models and variants having option for Bi-fuel operation and fitted with limp-home gasoline tank of capacity not exceeding two litres on two wheelers shall be exempted from test in gasoline mode.

[4] CO_2 emission and fuel consumption shall be measured as per procedure laid down in AIS 137 and as amended time to time.

* When bi-fuel vehicle is combined with a flex fuel vehicle, both test requirements are applicable. Vehicle tested with E100 need not to be tested with E85.

Classification of Vehicles and Weighting Factor

	Definition of class	WMTC Cycles	Weighting Factors
Class 1	Vehicles that fulfill the following specifications belong to class 1 : 50 cm^3 < engine capacity < 150 cm^3 and Vmax ≤ 50 km/h or engine capacity < 150 cm^3 and 50 km/h <Vmax< 100 km/h	Part 1 Reduced Speed Cold followed by	W1:50%
		Part 1 Reduced Speed Hot	W2:50%
Sub Class 2-1	Vehicles that fulfill the following specifications belong to sub class 2-1: Engine capacity < 150 cm^3 and 100 km/h ≤Vmax< 115 km/h or Engine capacity ≥150 cm^3 and Vmax< 115 km/h	Part 1 Reduced Speed Cold followed by	W1:50%
		Part 2 Reduced Speed Hot	W2:50%
Sub Class 2.2	Vehicles that fulfill the following specifications belong to sub class 2 - 2 : 115 km/h ≤ Vmax< 130 km/h	Part 1 Cold followed by	W1:50%
		Part 2 Hot	W2:50%
Sub Class 3-1	Vehicles that fulfill the following specifications belong to sub class 3 - 1 : 130 km/h ≤ Vmax< 140 km/h	Part 1 Cold followed by	W1: 25 %
		Part 2 Hot followed by	W2: 50%
		Part 3 Reduced Speed	W3: 25%
Sub Class 3-2	Vehicles that fulfill the following specifications belong to sub class 3 - 2 : Vmax ≥ 140 km/h	Part 1 Cold followed by	W1: 25 %
		Part 2 Hot followed by	W2: 50%
		Part 3	W3: 25%

The On-Board Diagnostic (OBD) systems for emission control

OBD Functions and Associate

Monitoring Items	OBD Stage I (BS VI) 1st April, 2020	OBD Stage II (BS VI) 1st April, 2023
Circuit continuity for all emission related power train component (if equipped)	✓	✓
Distance travelled since MIL (Malfunction indicator lamp) ON	✓	✓
Electrical disconnection of Electronic evaporative purge control device (if equipped and if active)	✓	✓
Catalytic converter monitoring	X	✓
EGR system monitoring	✓	✓
Misfire detection	X	✓
Oxygen sensor deterioration	X	✓

On-board (OBD) diagnostics emission thresholds for BSVI
Applicable from 1st April, 2023

Vehicle Class	OBD Stage II/Gasoline			
	CO mg/km	NMHC mg/km	NOx mg/km	PM mg/km
1 & 2 - 1	1900	250	300	50(1)
2 - 2	1900	250	300	50(1)
3 - 1 & 3 - 2	1900	250	300	50(1)
Vehicle Class	OBD Stage II /Diesel			
	CO mg/km	NMHC mg/km	NOx mg/km	PM mg/km
All	1900	320	540	50

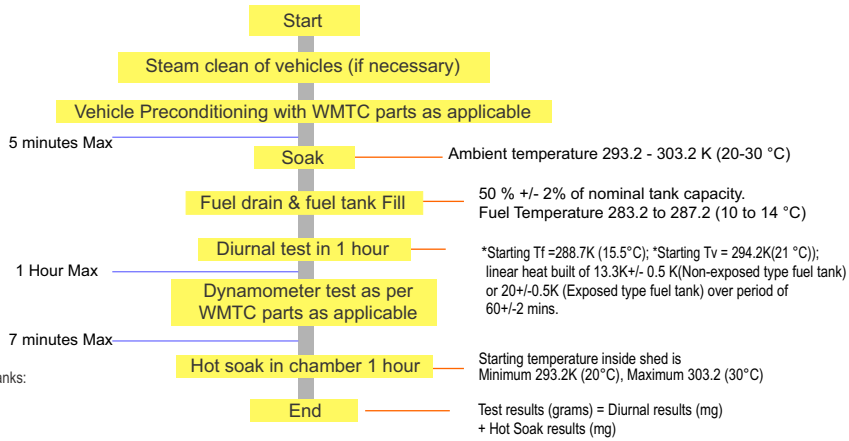
(1) In case of P.I engines, applicable to vehicles with direct injection engines.

2W Type IV Test: Evaporative Emission Determination SHED Test (BS - VI)

Soak Duration Table

Engine Capacity	Minimun (hours)	Maximum (hours)
≤ 169cm³	6	36
170 cm³ < engine capacity ≤ 279 cm³	8	36
>279 cm³	12	36

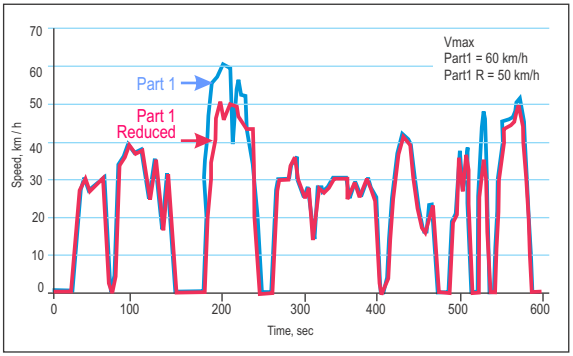
* For exposed type and non-exposed type fuel storage tanks:
Tf = required temperature of fuel (K)
Tv = required temperature of vapour (K)



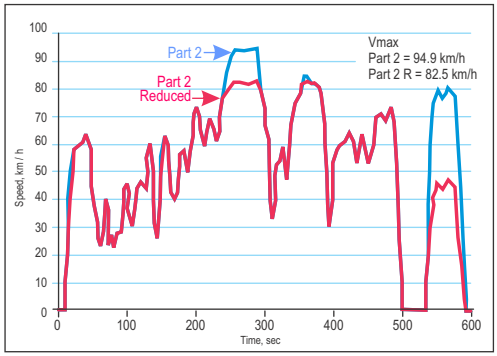
(Hot soak loss test -1 hr + Diurnal loss test -1 hr) Limit: 1500 mg/test

WMTC Test Cycles

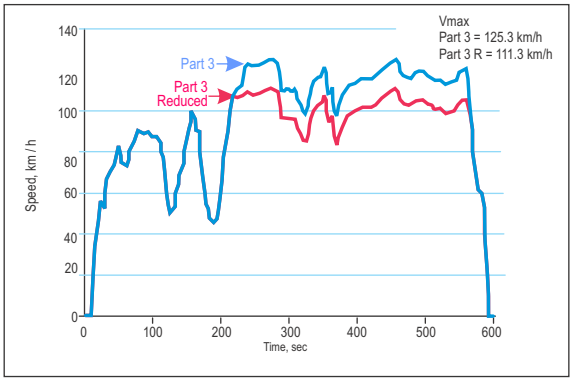
WMTC Part 1 & Part 1 Reduced Speed Cycles



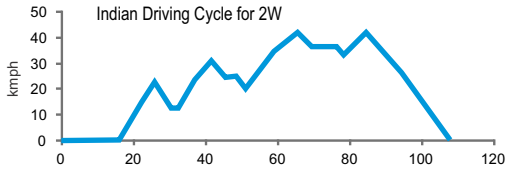
WMTC Part 2 & Part 2 Reduced Speed Cycles



WMTC Part 3 & Part 3 Reduced Speed Cycles



Driving Cycle Type I Test : 6 Cycles (IDC) Sampling



Cold Start with 40 Sec Idling

4 warm cycles	(108 sec each) (only for SI Engine)
6 sample cycles	(108 sec each)
Total Test Time:	648 sec
Total Test Distance:	3.948 km
Max speed:	42 kmph

Notes:

- Type I Test :- Spark Ignition (WMTC), Compression Ignition (IDC)
  Type II Test :- Idle & High Idle CO & HC
  Type III Test :- Crankcase ventilation from gasoline vehicle is not permitted.
- Determination of evaporative emission (Gasoline Vehicles) (Hot soak loss test -1 hr + Diurnal loss test -1 hr) Limit: 1.5 g/test
- $IUPR_n$ for BS VI Vehicles manufactured on or after 1st April 2023 shall be greater than or equal to 0.1 for all monitors M
  $IUPR_M$ = Numerator/Denominator (Indicates how often specific monitor is operating relative to vehicle operation)
  Numerator = Numerator measures number of times a monitoring function has run and a malfunction could have been detected
  Denominator = Denominator measures the number of driving events taking in to account special condition
- Conformity of production (COP) : at least 50 % of vehicle models produced from particular plant shall be selected randomly from dealer's location or warehouse.
- The Vehicle presented for Type Approval shall have been run at least 1000 km before the test

Engine Net Power Measurement Tolerance

For SI Engines

Test Type	Engine Type	Acceptable Tolerance Max. Power & Max. Torque (%)	Other measurement points on the curve (%)	Tolerance for engine speed (%)
Type Approval	≤11kW(≤1kW)*	±5 (±10)*	—	±1.5(±3)*
	> 11kW (>1kW)*	±2 (±5)*	—	±1.5(±3)*

For CI Engines

Test Type	Engine Type	Rated net power (%)	Other measurement points on the curve (%)	Tolerance for engine speed (%)
Type Approval	All	±2	±4	±2

Note: The engine power shall be measured on engine dynamometer and measured power shall conform to the power specified and tested as per procedure prescribed in AIS 137 and as amended time to time.
* for Moped Vehicles

Mass Emission Standards (BS IV) for 2 Wheelers Gasoline Vehicles

Applicability of Tests:
Type I Test:
Mass emission: Spark Ignition (WMTC)
Compression Ignition(IDC)
Type II Test:
Spark Ignition – Idle & high idle CO & HC
Compression Ignition: Free acceleration smoke
Type III Test:
Crankcase emission to atmosphere from gasoline vehicle is not permitted
Breather pipe to be connected to intake system

Type IV Test:
Determination of evaporative emission (Petrol Vehicles)
(Hot soak loss test – 1 hr. + Diurnal loss test – 1 hr.) Limit: 2 g/test or 6g/test
Type V Test:
Durability of anti-pollution devices

Mass emission standards (BS IV) for 2 wheelers with SI engines (Vehicle with cc>50 and Vmax > 50 kmph)

Class	TA = COP norms (g/km)			
	CO	NOx	HC + NOx	
			If the evaporative emission complies with 2 g/test	If the evaporative emission complies with 6 g/test
Class 1 and Sub-Class 2-1	1.403	0.39	0.79	0.59
Sub Class 2-2	1.970	0.34	0.67	0.47
Sub Class 3-1 and Sub Class 3-2	1.970	0.20	0.40	0.20

Note: Requirements of durability have been built in to mass emission standards specified above.
Mass emission standards (BS IV) shall come in to force for two wheeler manufactured on and after 1st April 2016 for new type of vehicle models and from 1st April, 2017 for existing type of vehicle models based on WMTC

Mass emission standards (BS IV) for 2 wheelers with SI engines
(Vehicle with cc <=50 and Vmax <= 50 kmph)

	TA = COP norms (g/km)	Deterioration factor (D.F)
CO	0.75	1.2
HC + NOx	0.75	1.2

2 wheeled vehicles fitted with diesel engines-
The mass emission standards shall be same as those applicable for diesel 3 wheelers.

Classification of Vehicles and Weighting Factors

for final emission result of 2 wheeler gasoline vehicle GSR 431 (E) dated 4 July 2014

Classification of Vehicles

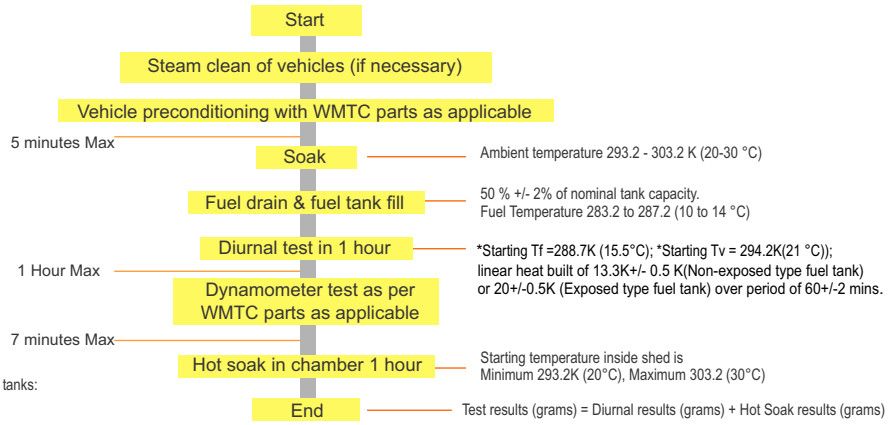
	Definition of Class	Cycles	Weighting Factor
Class 1	Vehicles that fulfill the following specifications belongs to class 1: 50 cc < Engine capacity < 150 cc and Vmax ≤ 50km/h or Engine capacity <150 cc and 50 km/h < Vmax < 100 km/h	Part 1 Reduced Speed cold	W1 : 50%
		Part 1 Reduced Speed Hot	W2: 50 %
Sub-Class 2.1	Vehicles that fulfill the following specification belong to class 2.1: Engine capacity <150 cc and 100 km/h ≤ Vmax ≤115 km/h or Engine capacity ≥ 150 cc and Vmax <115 km/h	Part 1 Reduced Speed cold	W1 : 50%
		Part 1 Reduced Speed Hot	W2 : 50%
Sub-Class 2.2	Vehicles that fulfill the following specification belong to class 2.2: 115 km/h ≤ Vmax<130km/h	Part 1 Cold	W1 : 30%
		Part 2 Hot	W2 : 70%
Sub-Class 3.1	Vehicles that fulfill the following specification belong to class 3.1: 130km/h≤Vmax<140 km/h	Part 1 Cold	W1: 25 %
		Part 2 Hot	W2: 50 %
		Part 3 Reduced Speed	W3: 25 %
Sub-Class 3.2	Vehicles that fulfill the following specification belong to class 3.2: Vmax ≥140 km/h	Part 1 Cold followed by	W1: 25 %
		Part 2 Hot followed by	W2: 50 %
		Part 3	W3: 25 %

2W Type IV Test: Evaporative Emission Determination SHED Test (BS - IV)

Soak Duration Table

Engine Capacity	Minimun (hours)	Maximum (hours)
≤ 169cm³	6	36
170 cm³ < engine capacity ≤ 279 cm³	8	36
>279 cm³	12	36

* For exposed type and non-exposed type fuel storage tanks:
Tf = required temperature of fuel (K)
Tv = required temperature of vapour (K)



(Hot soak loss test – 1 hr. + Diurnal loss test – 1 hr.) Limit: 2 g/test or 6g/test

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Scope : 2W (Gasoline)

Type I Test :
Exhaust emissions (IDC)

Type II Test :
Spark Ignition - Idle CO - HC

Type III Test :
The durability of Anti Pollution Device is determined either by an actual durability run over 30 000 km or by application of a fixed deterioration factor

Emission Limits *

Class	Pollutants	Limits** (g/km)
Class 1 & Sub Class 2.1	CO	1.87
	HC+NOx	1.08
Sub Class 2.2	CO	2.62
	HC+NOx	0.92
Sub Class 3.1	CO	2.62
	HC+NOx	0.55
Sub Class 3.2	CO	2.62
	HC+NOx	0.55

* Notification under issue by MORTH
** Limits with DF

WMTC Test Limits and Test Cycles For 2 Wheeler Gasoline Vehicles

Alternate Mass Emission Standards (BS III) for two wheeler gasoline vehicles, with engine capacity exceeding >50 cc and maximum design speed >50kmph based on WMTC GSR 515(E) dated 29 June 2012

Classification of Vehicles

	Definition of Class	Cycles	Weighting Factor
Class 1	Engine capacity above 50cc but less than 150cc and vehicle maximum speed equal to or less than 50 km/h OR Engine capacity less than 150cc and vehicle maximum speed more than 50km/h but less than 100 km/h.	Part 1 Reduced Speed cold	W1 : 50%
		Part 1 Reduced Speed Hot	W2: 50 %
Sub Class 2.1	Engine capacity less than 150 cc and vehicle maximum speed 100 km/h to less than115 km/h OR engine capacity 150 cc & above and vehicle maximum speed less than 115 km/h	Part 1 Reduced Speed cold	W1 : 50%
		Part 1 Reduced Speed Hot	W2 : 50%
Sub Class 2.2	Any engine capacity, vehicle maximum speed 115 km/h to less than 130 km/h	Part 1 Cold	W1 : 30%
		Part 2 Hot	W2 : 70%
Sub Class 3.1	Any engine capacity, vehicle maximum speed 130 km/h to less than 140 km/h	Part 1 Cold	W1: 25 %
		Part 2 Hot	W2: 50 %
		Part 3 Reduced Speed	W3: 25 %
Sub Class 3.2	Any engine capacity, vehicle maximum speed 140 km/h and above	Part 1 Cold	W1: 25 %
		Part 2 Hot	W2: 50 %
		Part 3	W3: 25 %

Emission Standards for 2 Wheeler Vehicles

Deterioration Factors (BS III)

Engine category	CO	HC+NOx	PM
2W (Gasoline engines)	1.20	1.20	-

BS - III Type I Limits

	Effective Date	Category	CO g/km	HC + NOx g/km	PM g/km
Gasoline	1.10.2010	2W	1.00	1.00	-

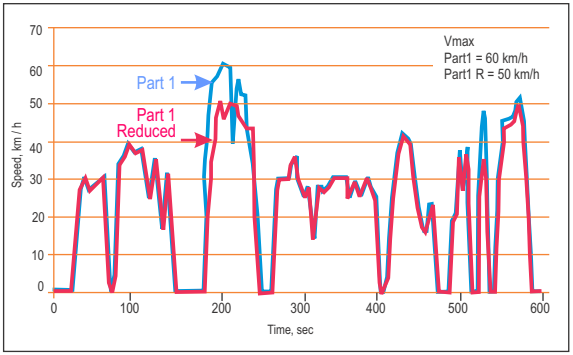
Emission Standard History for 2 Wheeler Vehicles

2 Wheelers	CO (g/km)	HC (g/km)	HC+NOx (g/km)
1991 Norms	12- 30	8 - 12	-
1996 Norms	4.50	-	3.60
BS - I Norms (2000)	2.00	-	2.00
BS - II Norms (2005)	1.50	-	1.50

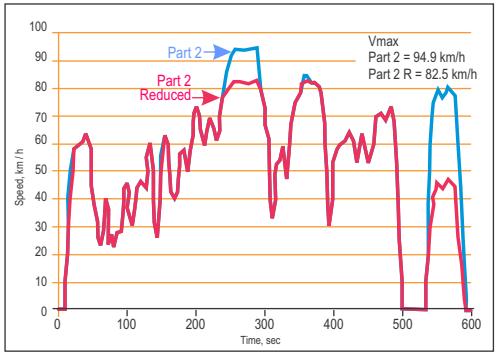
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WMTC Test Cycles

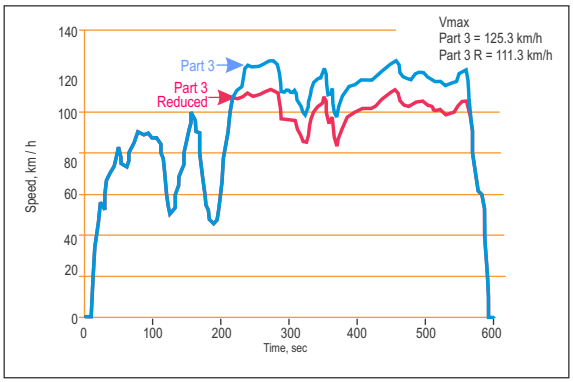
WMTC Part 1 & Part 1 Reduced Speed Cycles



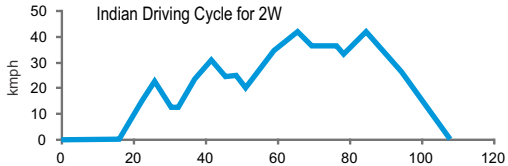
WMTC Part 2 & Part 2 Reduced Speed Cycles



WMTC Part 3 & Part 3 Reduced Speed Cycles



Driving Cycle Type I Test : 6 Cycles (IDC) Sampling



Cold Start with 40 Sec Idling
4 warm cycles (108 sec each) (only for SI Engine)
6 sample cycles (108 sec each)
Total Test Time: 648 sec
Total Test Distance: 3.948 km
Max speed: 42 kmph

The Emission Standards Bharat Stage VI (BS VI)

(3 wheelers vehicle models manufactured on or after 1st April 2020 as per GSR 889(E) dt. 16th Sept 2016.)

3 Wheelers Vehicles fitted with PI Engines

	CO mg/km	HC+NOx mg/km	NOx mg/km	EVAP mg/test	OBD	Durability mileage (km) Type V	Test Cycle (Cold Start at T=0 sec)
Limit	440	435	130	1500	Stage I& Stage II*	35000	IDC AIS137
D.F.	1.20	1.2	1.2	_	_	_	_

* OBD Stage II will be applicable from 1st April 2023

3 Wheelers Vehicle with CI engines

	CO mg/km	HC+NOx mg/km	NOx mg/km	PM	OBD	Durability mileage (km) Type V	Test Cycle (Cold Start at T=0 sec)
Limit	220	200	160	25	Stage I& Stage II*	35000	IDC AIS137
D.F.	1.10	1.0	1.00	1.20	_	_	

* OBD Stage II will be applicable from 1st April 2023

	Vehicle with PI engines including hybrids								Vehicles with CI engines including hybrids		
	Mono-fuel					Bi-fuel(3)		Flex-fuel	Flex-fuel	Mono-fuel	Dual Fuel
	Gasoline (E5)	LPG	CNG/Bio methane/ Bio-Gas/LNG	H_2	HCNG (Hydrogen + CNG)	Gasoline (E5) LPG	Gasoline (E5) CNG/Bio methane	Gasoline (E5) Ethanol (E85)	Diesel (B7) Biodiesel up to100% (1)	Diesel (B7)	Diesel + CNG
Gaseous pollutant (Type I test)	Yes	Yes	Yes	Yes	Yes	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes	Yes
(2) Type I test Particulate mass	Yes	No	No	No	No	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (both fuels)	Yes	Yes
Idle emission (Type II test)	Yes	Yes	Yes	Yes	Yes	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	No	No	No
Crankcase emission (Type III test)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Evaporative emission (Type IV test)	Yes	No	No	No	No	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	No	No	No
Durability (Type V test)	Yes	Yes	Yes	Yes	Yes	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (B7 only)	Yes	Yes
(4) CO_2 & Fuel consumption	Yes	Yes	Yes	Yes	Yes	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes	Yes
OBD	Yes	Yes	Yes	Yes	Yes	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (B7 only)	Yes	Yes
Smoke Opacity	No	No	No	No	No	No	No	No	Yes (B7 only)	Yes	Yes

(1) Vehicles fuelled with bio diesel blends up to 7% shall be tested with reference diesel (B7) and vehicles fuelled with Bio diesel blends above 7% will be tested with respective blends.

(2) In case of PI engines, applicable only to vehicles with direct Injection engines.

(3) Vehicle models and variants having option for Bi-fuel operation and fitted with limp-home gasoline tank of capacity not exceeding 3 litres on 3 wheelers shall be exempted from test in gasoline mode.

(4) CO_2 emission and fuel consumption shall be measured as per procedure laid down in AIS 137 and as amended time to time.

* When bi-fuel vehicle is combined with a flex fuel vehicle,both test requirements are applicable. Vehicle tested with E100 need not to be tested with E85.

The On-Board Diagnostic (OBD) systems for emission control shall be as specified in the following Table:

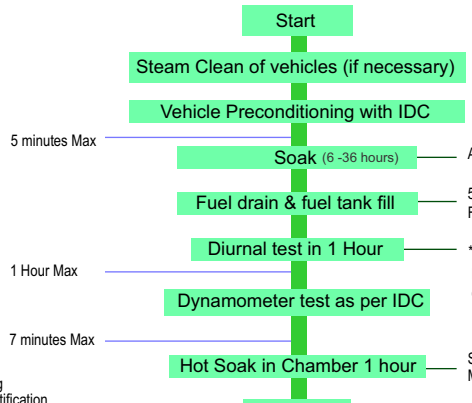
OBD Functions and Associate

Monitoring Items	OBD Stage I (BS VI) 1st April, 2020	OBD Stage II (BS VI) 1st April, 2023
Circuit continuity for all emission related power train component (if equipped)	✓	✓
Distance travelled since MIL (Malfunction Indicator Lamp) ON	✓	✓
Electrical disconnection of Electronic evaporative purge control device (if equipped and if active)	✓	✓
Catalytic converter monitoring	X	✓
EGR system monitoring	X	✓
Misfire detection	X	✓
Oxygen sensor deterioration	X	✓

On-board (OBD) diagnostics emission thresholds for BSVI Applicable from 1st April, 2023

Vehicle	OBD Stage II Gasoline	
	CO mg/km	NOx mg/km
Gasoline	880	425
	OBD Stage II Diesel Vehicles	
Diesel	CO mg/km	NOx mg/km
	440	300

3W Type IV Test: Evaporative Emission Determination Shed Test (BS-VI)



(Hot Soak Loss test -1 hr +Diurnal loss test – 1hr) Limit: 1500 mg/test

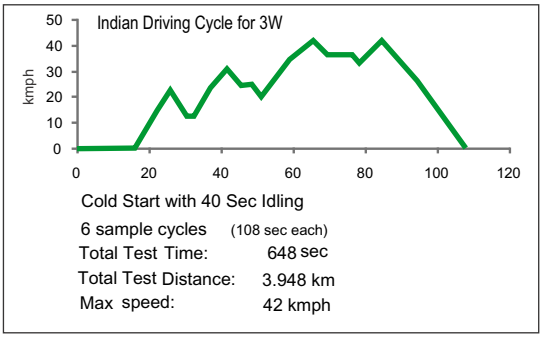
Note : Tailpipe emission may be measured during dynamometer test, but these are not used for certification

* For exposed type and non-exposed type fuel storage tanks:

Tf = required temperature of fuel (K)

Tv = required temperature of vapour (K)

Driving Cycle Type I Test : 6 Cycles (IDC) Sampling



Notes :

- **Type I Test :** Mass emission Test Cycle : (IDC)
- **Type II Test :** Spark Ignition – idling CO & HC, Compression Ignition – Free Acceleration smoke
- **Type III Test :** Crankcase emission from gasoline vehicle is not permitted
- **Type IV Test:** Determination of evaporative emission (gasoline vehicles)

(Hot Soak Loss Test -1 hr +Diurnal loss Test – 1hr) Limit: 1.5 g/test

The Vehicle presented for type Approval shall have been run for 1000 km before test

Engine Net Power Measurement Tolerance

For SI Engines

Test Type	Engine Type	Acceptable Tolerance Max. Power & Max. Torque (%)	Other measurement points on the curve (%)	Tolerance for engine speed (%)
Type Approval	≤ 11kW	±5	—	±1.5
	> 11kW	±2	—	±1.5

For CI Engines

Test Type	Engine Type	Rated net power (%)	Other measurement points on the curve (%)	Tolerance for engine speed (%)
Type Approval	All	±2	±4	±2

Note: The engine power shall be measured on engine dynamometer and the measured power shall confirm to the power specified and tested as per procedure prescribed in AIS 137 and as amended time to time

Mass Emission Test Standard (BS IV) for 3 Wheelers

as per GSR 487 (E) dated 12 June 2015

Applicability of Tests :

Type I Test :
Mass emission (IDC)

Type II Test :
Spark Ignition – Idling CO & HC
Compression Ignition – Free acceleration smoke

Type III Test :
Crankcase emission from gasoline vehicle is not permitted
Breather pipe to be connected to intake system

Type IV Test :
Determination of evaporative emission (Petrol Vehicles)
(Hot soak loss test – 1 hr. + Diurnal loss test – 1 hr.) **Limit: 2 g/test or 6g/test**

Type V Test :
Durability of anti-Pollution devices

Mass emission standards (BS IV) shall come in to force for Three wheeler manufactured on and after 1st April 2016 for new type of vehicle models and from 1st April, 2017 for existing type of vehicle models

Three wheelers fitted with gasoline engines:

	CO	HC + NOx	
		If the evaporative emission complies with 2.0 g/test	If the evaporative emission complies with 6.0 g/test
TA = COP norms (g/km)	0.940	0.940	0.740
D.F (Deterioration factor)	1.2	1.2	1.2

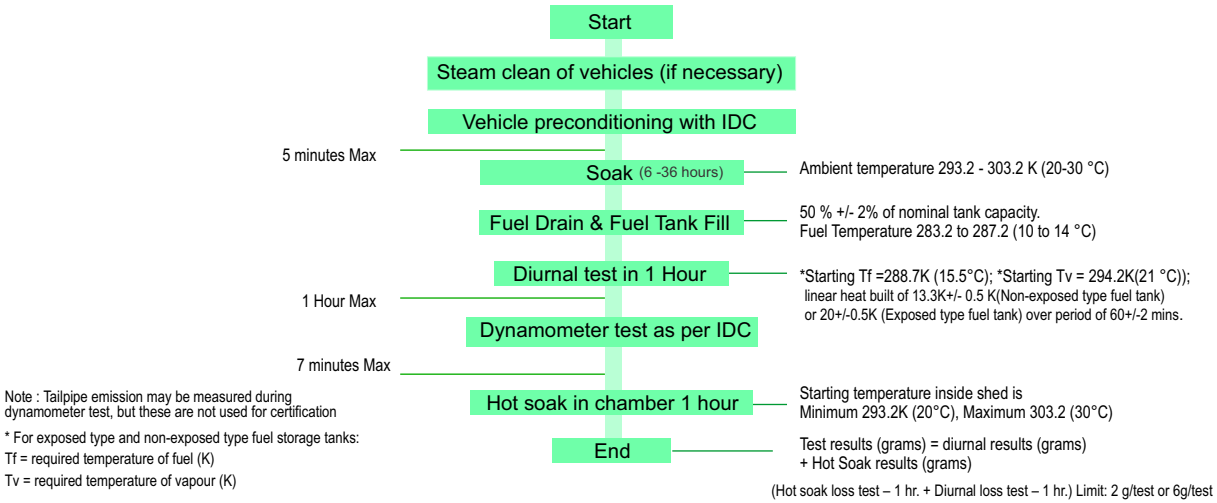
Three wheelers fitted with Compressed Natural Gas (CNG) or Liquefied Petroleum Gas (LPG) engines:

	CO	HC + NOx
TA = COP norms (g/km)	0.940	0.940
Deterioration factor (D.F)	1.2	1.2

Three wheelers fitted with Compression Ignition engines:

	CO	HC + NOx	PM
TA = COP norms (g/km)	0.380	0.380	0.0425
Deterioration factor (D.F)	1.1	1.0	1.2

3W Type IV Test : Evaporative Emission Determination Shed Test (BS-IV)



Note : Tailpipe emission may be measured during dynamometer test, but these are not used for certification

* For exposed type and non-exposed type fuel storage tanks:
Tf = required temperature of fuel (K)
Tv = required temperature of vapour (K)

Scope : 3W (Gasoline & Diesel)

Type I Test :
Exhaust emissions (IDC)

Type II Test :
Spark Ignition - Idle CO - HC
Compression Ignition (3W only) - Free acceleration Smoke

Type III Test :
The durability of Anti Pollution Device is determined either by an actual durability run over 30 000 km or by application of a fixed deterioration factor

Deterioration Factors

Engine category	CO g/km	HC + NOx g/km	PM g/km
3W (Gasoline/ Gaseous fueled engines)	1.20	1.20	-
3W (Diesel engines)	1.10	1.00	1.20

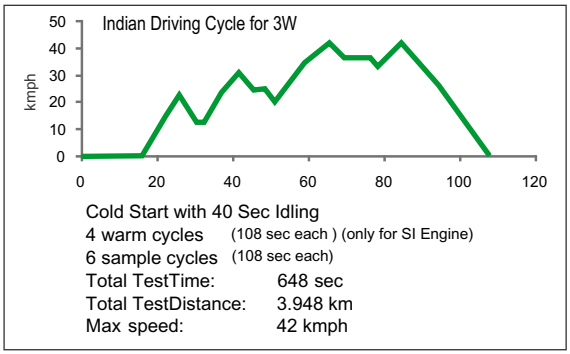
BS - III Type I Limits

	Effective Date	Category	CO g/km	HC + NOx g/km	PM g/km
Gasoline	1.10.2010	3W	1.25	1.25	-
Diesel		3W	0.50	0.50	0.05

Emission Standard History 3 Wheeler Vehicles

Three - Wheelers (Gasoline)	CO (g/km)	HC (g/km)	HC+NOx (g/km)	
1991 Norms	12 - 30	8-12	-	
1996 Norms	6.75	-	5.40	
BS - I Norms (2000)	4.00	-	2.00	
BS - II (2005)	2.25	-	2.00	
Three - Wheelers (Diesel)	**CO (g/km)**	**HC (g/km)**	**HC+NOx (g/km)**	**PM (g/km)**
1991 Norms	12 - 30	8-12	-	-
1996 Norms	6.75	-	5.40	-
BS - I Norms (2000)	2.72	-	0.97	0.14
BS - II (2005)	1.00	-	0.85	0.10

Driving Cycle Type I Test : 6 cycles (IDC) sampling



Cold Start with 40 Sec Idling
4 warm cycles (108 sec each) (only for SI Engine)
6 sample cycles (108 sec each)
Total TestTime: 648 sec
Total TestDistance: 3.948 km
Max speed: 42 kmph

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The Emission Standards Bharat Stage IV (BS IV)
(As per G.S.R. 518(E) dated 01st Jun 2018)

Quadricycles (L7) fitted with Gasoline or Compressed Natural Gas (CNG) or Liquefied Petroleum Gas (LPG) engines.

	TA=COP norms			EVAP (g/test)	OBD
	CO(g/km)	HC(g/km)	NOx(g/km)		
Limit	2.0	0.55	0.25	<=2.0	Stage I
D.F.	1.3	1.2	1.2	–	–

Fitted with CI Engine

	TA=COP norms				OBD
	CO	HC	Nox	PM	
	(g/km)				
Limit	1.0	0.10	0.55	0.08	Stage I
D.F.	1.3	1.2	1.2	1.1	–

OBD - Stage I

Monitoring Items	All Positive ignition vehicles	All Compression ignition vehicles
Oxygen (O_2) sensor	✓	-
Secondary Air System, if provided	✓	-
Electronic fuel injection system	-	✓
Coolant temperature	✓	✓
EGR, (Exhaust Gas Recirculation), if provided	✓	✓
Emission Control system / components (Comprehensive Components)	✓	✓
Circuit continuity for all emission related power train components	✓	✓
Distance travelled since MIL (Malfunction Indicator Lamp) ON	✓	✓

Notes:

(i) Type I test: Mass emission Test cycle on Chassis dynamometer : Modified ECE R40

(ii)(a) Reference mass : kerb weight + 150 kg;

(b) Number of test cycles: Six (6), with weightage factors first cycle: 30%; remaining: 70%;

(c) Modified ECE R40 cycle with maximum speed of 43km/hr.

(iii) Type II Test: Spark Ignition –idling CO & HC & high idle CO& λ, Compression Ignition: Free Acceleration Smoke

(iv) Type III Test : Crankcase emission from gasoline vehicle not permitted

(v) Type IV Test: Determination of evaporative emission (gasoline Vehicle) (Hot Soak Loss Test 1 Hr + Diurnal loss test 1 hr): Limit 2.0 g/test

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The Emission Standards for Bharat Stage VI (BS-VI)

for category M and N vehicles having Gross Vehicle Weight not exceeding 3500kg, manufactured on or after 1 April 2020 for all models, as per GSR 889 dt. 16 Sept 2016.

		Reference Mass (RM) (kg)	Mass of Carbon Monoxide (CO)		Mass of Total Hydrocarbons (THC)		Mass of Non-Methane Hydrocarbons (NMHC)		Mass of Oxides of Nitrogen (NOx)		Combined Mass of Hydrocarbons and Oxides of Nitrogen (THC + NOx)		Mass of Particulate Matter (PM)		Number of Particles (PN)	
			L1 (mg/km)		L2 (mg/km)		L3 (mg/km)		L4 (mg/km)		L2 + L3 (mg/km)		L5 (mg/km)		L6 (numbers/km)	
Category	Class		PI	CI	PI	CI	PI	CI	PI	CI	PI	CI	PI[1]	CI	PI [1] [2]	CI
M (M1 & M2)	—	All	1000	500	100	—	68	—	60	80	—	170	4.5	4.5	$6.0X\ 10^{11}$	$6.0X\ 10^{11}$
N1	I	RM ≤ 1305	1000	500	100	—	68	—	60	80	—	170	4.5	4.5	$6.0X\ 10^{11}$	$6.0X\ 10^{11}$
	II	1305<RM ≤ 1760	1810	630	130	—	90	—	75	105	—	195	4.5	4.5	$6.0X\ 10^{11}$	$6.0X\ 10^{11}$
	III	1760<RM	2270	740	160	—	108	—	82	125	—	215	4.5	4.5	$6.0X\ 10^{11}$	$6.0X\ 10^{11}$
N2	—	All	2270	740	160	—	108	—	82	125	—	215	4.5	4.5	$6.0X\ 10^{11}$	$6.0X\ 10^{11}$

PI = Positive Ignition, CI = Compression Ignition

(1) For positive ignition, particulate mass and number of particles limit shall apply only to vehicles with direct injection engines.

(2) Until three years after date of implementation for new type approvals and new vehicles, particle number emission limit of 6.0×10^{12} /km shall apply to BS VI gasoline direct injection vehicles upon choice of the manufacturer.

Deterioration Factor shall be as given below: BS VI

Engine Category	Assigned Deterioration Factor						
	CO	THC	NMHC	NOx	HC + NOx	Particulate Matter (PM)	Particle Number (PN)
Positive Ignition	1.5	1.3	1.3	1.6	—	1.0	1.0
Compression Ignition	1.5	—	—	1.1	1.1	1.0	1.0

Note: Alternatively the vehicle manufacturer may opt for vehicle ageing test of 1,60,000 km or bench ageing durability test

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OBD Threshold for BS VI Vehicles Manufactured on or after 1st April 2020 :

On-Board Diagnostic (BS VI - OBD-I) Threshold : BS VI

		Reference Mass (RM) (kg)	Mass of Carbon Monoxide (CO) (mg/km)		Mass of Non-Methane Hydrocarbons (NMHC) (mg/km)		Mass of Oxides of Nitrogen (NOx) (mg/km)		Mass of Particulate Matter (PM) (mg/km)	
Category	Class		PI	CI	PI	CI	PI	CI	PI[1]	CI
M (M1 & M2)	-	All	1900	1750	170	290	150	180	25	25
N1	I	RM ≤ 1305	1900	1750	170	290	150	180	25	25
	II	1305<RM ≤1760	3400	2200	225	320	190	220	25	25
	III	1760 < RM	4300	2500	270	350	210	280	30	30
N2	—	All	4300	2500	270	350	210	280	30	30

[1] For positive ignition, particulate mass limits apply only to vehicles with direct injection engines

OBD Threshold for BS VI Vehicles Manufactured on or after 1st April 2023 :

On-Board Diagnostic (BS VI- OBD- II) Threshold : BS VI

		Reference Mass (RM) (kg)	Mass of Carbon Monoxide (CO) (mg/km)		Mass of Non-Methane Hydrocarbons (NMHC) (mg/km)		Mass of Oxides of Nitrogen (NOx) (mg/km)		Mass of Particulate Matter (PM) (mg/km)	
Category	Class		PI	CI	PI	CI	PI	CI	PI[1]	CI
M (M1 & M2)	-	All	1900	1750	170	290	90	140	12	12
N1	I	RM ≤ 1305	1900	1750	170	290	90	140	12	12
	II	1305<RM ≤1760	3400	2200	225	320	110	180	12	12
	III	1760 < RM	4300	2500	270	350	120	220	12	12
N2	—	All	4300	2500	270	350	120	220	12	12

[1] For positive ignition, particulate mass limits apply only to vehicles with direct injection engines

Application of Test Requirements for Type-Approval – BS VI

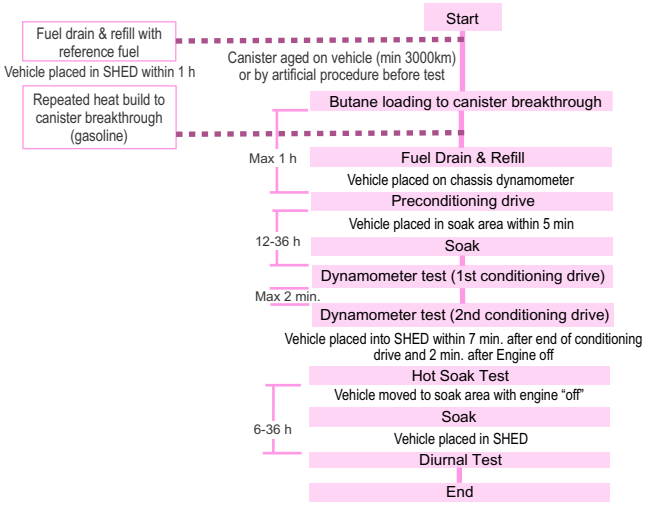
Reference Fuel	Vehicle with PI engines including hybrids									Vehicles with CI engines including hybrids		
	Mono-fuel					Bi-fuel[(1)]			Flex-fuel[1]	Flex-fuel	Mono-fuel	Dual Fuel
	Gasoline (E5)	LPG	CNG/Bio methane/ Bio-Gas/LNG	Hydrogen (ICE)[(3)]	H_2CNG (Hydrogen +CNG)	Gasoline (E5) + LPG	Gasoline (E5) + CNG/Bio methane	Gasoline (E5) + Hydrogen (ICE)[3]	Gasoline (E5) + Ethanol (E85)/(E100)	Diesel (B7) + Biodiesel up to 100% [(5)]	Diesel (B7)	Diesel + CNG
Gaseous pollutant (Type I test)	Yes	Yes	Yes	Yes[(2)]	Yes	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)[2]	Yes (both fuels)	Yes	Yes	Yes
Particulate Mass and Particulate Number (Type 1 Test)	Yes[4]	–	–	–	–	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (both fuels)	Yes	Yes	Yes
Idle emission (Type II test)	Yes	Yes	Yes	–	Yes	Yes (both fuels)	Yes (both fuels)	Yes (gasoline only)	Yes (both fuels)	–	–	–
Crankcase emission (Type III test)	Yes	Yes	Yes	–	Yes	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	–	–	–

continued....

Evaporative emission (Type IV test)	Yes	–	–	–	–	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	–	–	–
Durability (Type V test)	Yes	Yes	Yes	Yes	Yes	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (gasoline only)	Yes (B7 only)	Yes	Yes
In-Service Conformity	Yes	Yes	Yes	Yes	Yes	Yes (both fuels)	Yes (both fuels)	Yes (gasoline only)	Yes (both fuels)	Yes (B7 only)	Yes	Yes
On-Board Diagnostics and IUPRm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
[(6)]CO_2 emission and fuel consumption	Yes	Yes	Yes	Yes	Yes	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes	Yes
Smoke Opacity	–	–	–	–	–	–	–	–	–	Yes	Yes	–
Engine Power	Yes	Yes	Yes	Yes	Yes	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes (both fuels)	Yes	Yes	Yes

(1) When a bi-fuel vehicle has flex fuel option, both test requirements are applicable. Vehicle tested with E100 need not to be tested for E85.
(2) Only NOx emissions shall be determined when the vehicle is running on Hydrogen.
(3) Reference Fuel is 'Hydrogen for Internal Combustion Engine' as Specified in page 83
(4) For Positive ignition, particulate mass and number limits for vehicles with positive ignition engines including hybrids shall apply only to vehicles with direct injection engines.
(5) Vehicle fuelled with Bio diesel blends up to 7% will be tested with reference diesel (B7) & vehicles fuelled with Bio diesel blends above 7% will be tested with respective blends.
(6) CO_2 emission and fuel consumption shall be measured as per procedure laid down in AIS 137 and as amended time to time.

Type VI Test : Evaporative Emission Test



Fuel temperature:283K to 287K (10-14 ˚C))
40% ±2% of nominal tank capacity Ambient temperature :293K to 303K (20-30˚C)

Butane /Nitrogen mixture loading at 40 g butane/hr to breakthrough of canister

Fuel temperature: 291K ± 8K (18 ± 8 ˚C)) 40% ± 2% of nominal tank capacity
Ambient temperature 293K - 303K (20-30˚C)

1 X Part 1 + 2 X Part 2 of Type I test cycle T_{start} = 293 K to 303 K (20-30 ˚C)

Ambient temperature: 293K to 303 K (20-30˚C) Oil and coolant temperatures must reach soak area temperature within ±3 K (±3 ˚C)

Type 1 test cycle T_{start} = 293 K to 303 K (20-30 ˚C)

Type 1: Part 1

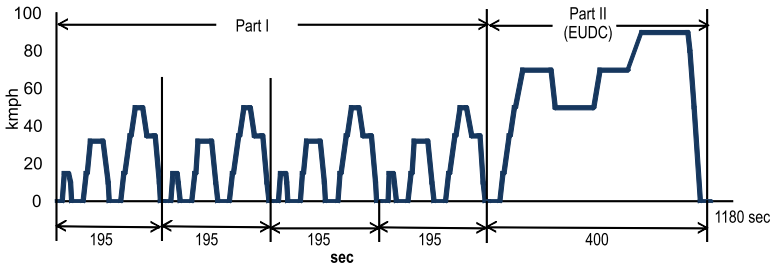
Tmin = 296 K(23˚C) Hot Soak Test
Tmax = 304 K(31˚C) HC measurement
60 min ± 0.5min

T = 293 K ± 2K (20 ± 2 ˚C)) for at least 6 hours

1 Diurnal temperature profile with Tstart= 293 K (20 ˚C)) and Tmax = 308 K (35˚C)) begins within 10 min after closing of the SHED together with initial HC - measurement. Final diurnal test HC measurement after 24hrs ± 6 min

DRIVING CYCLES
Type I Test

1. Modified Indian Driving Cycle (Bharat stage Norms)



Total test time: 1180 sec
Total distance: 10.647 km
Max. speed: 90 km/h
Maximal Acceleration: 0.833 m/s^2
Maximal Deceleration:1.389 m/s^2

Notes :

- **Type I Test :** Mass emission Test Cycle: MIDC
- **Type II Test :** Spark Ignition – idling CO & HC and high idle CO and λ,
  Compression Ignition – Free acceleration smoke
- **Type III Test :** Crankcase emission from vehicle is not permitted
- **Type IV Test :** Determination of evaporative emission (gasoline vehicles)
  (Hot Soak Loss Test -1 hr +Diurnal loss Test – 24hr) Limit :2g / test
- For Diesel vehicles, the emission of visible pollutants (smoke) shall not exceed the limit value of smoke density,when expressed as light absorption coefficient for various nominal flows as given on page No.77 when tested at constant speeds over the full load.
- IUPRm for BS-VI Vehicles manufactured on or after 1st April 2023 shall be greater than or equal to 0.1 .
- During type approval and COP applicable from 1st April, 2020, real world driving cycle emission measurement using PEMS shall be carried out for data collection and from 1st April, 2023 real world driving cycle emission conformity shall be applicable.

Engine Net Power Measurement Tolerance

Engine Type	Engine Type	Rated net power(%)	Other measurement points on the curve (%)	Tolerance for engine speed (%)
Type Approval	All	±2	±4	±2

Note: The engine power shall be measured on engine dynamometer and the measured power shall conform to the powerspecified in AIS 137 as amended from time to time, when tested as per the procedures laid down in AIS 137as amended from time to time

Type I Limits (BS-III & BS-IV)

	Effective Date	Category	Class	RM (kg)	CO (g/km)	HC (g/km)	NO_x (g/km)	HC + NO_x (g/km)	PM (g/km)	Evap. Emission (g/test)
Gasoline	BS- III 1 April 05 -NCR 11 Cities 1 Oct 10- Nationwide	M (GVW ≤ 2500 or up to 6 seater)	----	----	2.30	0.20	0.15	----	----	2.00
		N1 & M (GVW>2500 or above 6 seater)	I	RM ≤ 1305	2.30	0.20	0.15	----	----	
			II	1305<RM ≤1760	4.17	0.25	0.18	----	----	
			III	1760<RM	5.22	0.29	0.21	----	----	
	BS - IV 1 April 10 - NCR 13 Cities	M (GVW ≤ 2500 or upto 6 seater)	----	----	1.00	0.10	0.08	----	----	2.00
		N1 & M (GVW>2500 or above 6 seater)	I	RM ≤ 1305	1.00	0.10	0.08	----	----	
			II	1305<RM ≤1760	1.81	0.13	0.10	----	----	
			III	1760< RM	2.27	0.16	0.11	----	----	

For BS IV

2010.04	NCR,13 cities
2015.07	Above plus 29 cities mainly in the states of Haryana, Uttar Pradesh, Rajasthan and Maharashtra
2015.10	North India plus bordering districts of Rajasthan (9 states)
2016.04	Western India plus parts of south and East India
2017.04	Nationwide

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	Effective Date	Category	Class	RM (kg)	CO (g/km)	HC (g/km)	NOx (g/km)	HC + NO x (g/km)	PM (g/km)
Diesel	BS- III 1 April 05 -NCR 11 Cities 1 Oct 10- Nationwide	M (GVW ≤ 2500 or upto 6 seater)	----	----	0.64	----	0.50	0.56	0.05
		N1 & M (GVW>2500 or above 6 seater)	I	RM ≤ 1305	0.64	----	0.50	0.56	0.05
			II	1305<RM≤1760	0.80	----	0.65	0.72	0.07
			III	1760< RM	0.95	----	0.78	0.86	0.10
	BS - IV 1 April 10 -NCR 13 Cities	M (GVW ≤ 2500 or upto 6 seater)	----	----	0.50	----	0.25	0.30	0.025
		N1 & M (GVW>2500 or above 6 seater)	I	RM ≤ 1305	0.50	----	0.25	0.30	0.025
			II	1305<RM≤1760	0.63	----	0.33	0.39	0.04
			III	1760< RM	0.74	----	0.39	0.46	0.06

For BS IV

2010.04	NCR,13 cities
2015.07	Above plus 29 cities mainly in the states of Haryana, Uttar Pradesh, Rajasthan and Maharashtra
2015.10	North India plus bordering districts of Rajasthan(9 states)
2016.04	Western India plus parts of south and East India
2017.04	Nationwide

Additional requirements

On-Board diagnostic (OBD) from BS IV

IOBD - I from 1 April 2010
-Discontinuity test: MIL must be activated if discontinuity of emission-related component occurs.

IOBD - II from 1 April 2013
-MIL must be activated if emission related components cause emission to exceed OBD threshold.

OBD Threshold

Category	Class	RM (kg)	CO (g/km)		HC (g/km)		NOx (g/km)		PM (g/km)
			Petrol	Diesel	Petrol	Diesel	Petrol	Diesel	Diesel
M (GVW ≤ 2500 or upto 6 seater)		All	3.20	3.20	0.40	0.40	0.60	1.20	0.18
N1 & M (GVW>2500 or above 6 seater)	I	RM ≤1305	3.20	3.20	0.40	0.40	0.60	1.20	0.18
	II	1305<RM≤1760	5.80	4.00	0.50	0.50	0.70	1.60	0.23
	III	1760 < RM	7.30	4.80	0.60	0.60	0.80	1.90	0.28

Emission Standards for Passenger Cars & Light Commercial Vehicles (BS IV)

Scope: M and N1 class I, II & III

Type I Test :
Exhaust emissions (MIDC)

Type II Test
Spark Ignition-Idling CO & HC, High Idle CO & λ
Compression Ignition-Free acceleration smoke

Type III Test
Crankcase emission from gasoline vehicle is not permitted

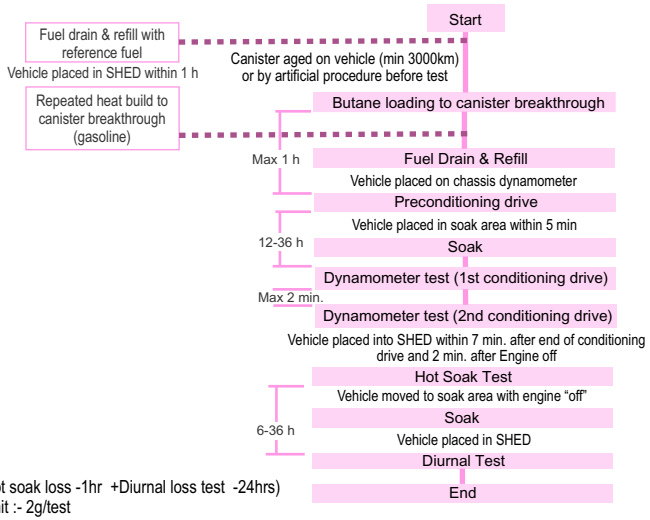
Type IV Test
Evaporative emissions measured in the SHED from gasoline vehicles.
(Hot soak loss -1hr +Diurnal loss test -24hrs) Limit:-2g/test

Type V Test
The durability of Anti Pollution Device is determined either by an actual durability run over 80,000 km or by application of a fixed deterioration factor

Fixed Deterioration Factors

Engine category	CO	HC	NOx	HC+NOx	PM
Gasoline/Gaseous fuelled engines	1.2	1.2	1.2	NA	NA
Diesel Engines	1.1	NA	1	1	1.2

Type IV Test : Evaporative Test



(Hot soak loss -1hr +Diurnal loss test -24hrs)
Limit :- 2g/test

Fuel temperature:283K to 287K (10-14 °C))
40% ±2% of nominal tank capacity Ambient temperature :293K to 303K (20-30°C)

Butane /Nitrogen mixture loading at 40 g butane/hr to breakthrough of canister

Fuel temperature: 291K ± 8K (18 ± 8 °C)) 40% ± 2% of nominal tank capacity
Ambient temperature 293K - 303K (20-30°C)

1 X Part 1 + 2 X Part 2 of Type I test cycle T_{start} = 293 K to 303 K (20-30 °C)

Ambient temperature: 293K to 303 K (20-30°C) Oil and coolant temperatures must reach soak area temperature within ±3 K (±3 °C)

Type 1 test cycle T_{start} = 293 K to 303 K (20-30 °C)

Type 1: Part 1

Tmin = 296 K(23°C) Hot Soak Test
Tmax = 304 K(31°C) HC measurement
60 min ± 0.5min

T = 293 K ± 2K (20 ± 2 °C)) for at least 6 hours

1 Diurnal temperature profile with Tstart= 293 K (20 °C)) and Tmax = 308 K (35°C)) begins within 10 min after closing of the SHED together with initial HC - measurement. Final diurnal test HC measurement after 24h ± 6 min

Passenger Cars and Light Commercial Vehicles (Gasoline) Emission Standard History

1991 Norms From 1st Apr 1991

Category	CO (g/km)	HC (g/km)
rw ≤ 1020	14.30	2.00
1020 < rw ≤ 1250	16.50	2.10
1250 < rw ≤ 1470	18.80	2.10
1470 < rw ≤ 1700	20.70	2.30
1700 < rw ≤ 1930	22.90	2.50
1930 < rw ≤ 2150	24.90	2.70
rw > 2150	27.10	2.90

1996 Norms From 1st Apr 1996 *

Category	CO (g/km)	HC+NOx (g/km)
cc ≤ 1400	8.68	3.00
1400 < cc ≤ 2000	11.20	3.84
Above 2000	12.40	4.36

1998 Norms From 1st Apr 1998 *

Category	CO (g/km)		HC + NOx (g/km)	
	N-Cat	Cat	N-Cat	Cat
cc ≤ 1400	8.68	4.34	3.00	1.50
1400 < cc ≤ 2000	11.20	5.60	3.84	1.92
Above 2000	12.40	6.20	4.36	2.18

BS I Norms *

	Category	CO (g/km)	HC + NOx (g/km)
1stJune 1999 in National capital region of Delhi and in other case on and after 1st April 2000	All Passenger Cars	2.72	0.97

BS II Norms *

	Category			CO (g/km)	HC+NOx (g/km)
		Class	RM (kg)		
1st Apr 2000 & 2001 for M & N1 respectively in National Capital Region, 1st Jan 2001 in Mumbai, 1st Jul 2001 in Calcutta & in Chennai and in other case on and after 1st April 2005	M (GVW ≤ 2500 or upto 6 seater)	-	-	2.20	0.50
	N1 & M (GVW>2500 or above 6 seater)	I	RM ≤ 1250	2.20	0.50
		II	1250<RM ≤1700	4.00	0.60
		III	1700 < RM	5.00	0.70

* Evaporative Emission Test (1 hr Hot soak + 1 hr Diurnal loss test) Limit :- 2 g/test

N-cat - Vehicle without Catalytic Converter
Cat - Vehicle with Catalytic Converter

Passenger Cars and Light Commercial Vehicles (Diesel) Emission Standard History

1992 Norms From1st Apr 1992

Category RM (kg)	CO (g/km)	HC+NOx (g/km)	PM (g/km)
RM ≤ 1020	14.3	4.7	-
1020 < RM ≤ 1250	16.5	5.1	-
1250 < RM ≤ 1470	18.8	5.4	-
1470 < RM ≤ 1700	20.7	5.8	-
1700 < RM ≤ 1930	23.0	6.2	-
1930 < RM ≤ 2150	24.9	6.5	-
2150 > RM	27.1	6.9	-

BS I Norms

	Category RM (kg)	CO (g/km)	HC+NOx (g/km)	PM (g/km)
1st June 1999 in National capital region of Delhi and in other case on and after 1st April 2000	RM ≤ 1250	2.72	0.97	0.14
	1250<RM ≤ 1700	5.17	1.40	0.19
	1700< RM	6.90	1.70	0.25

1996 Norms From 1st Apr 1996

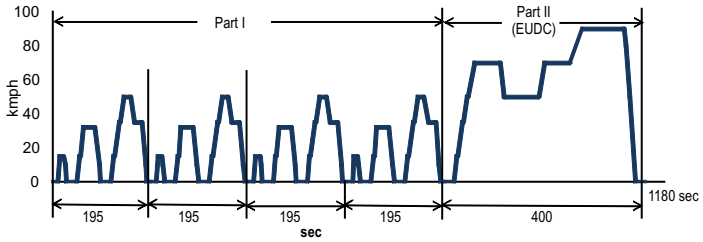
Category RM (kg)	CO (g/km)	HC+NOx (g/km)	PM (g/km)
RM ≤ 1020	5.00	2.00	-
1020 < RM ≤ 1250	5.70	2.20	-
1250 < RM ≤ 1470	6.40	2.50	-
1470 < RM ≤ 1700	7.00	2.70	-
1700 < RM ≤ 1930	7.70	2.90	-
1930 < RM ≤ 2150	8.20	3.50	-
2150 > RM	9.00	4.00	-

BS II Norms

	Category			CO (g/km)	HC+NOx (g/km)	PM (g/km)
		Class	RM (kg)			
1st Apr 2000 & 2001 for M & N1 respectively in National Capital Region, 1st Jan 2001 in Mumbai, 1st Jul 2001 in Calcutta & in Chennai and in other case on and after 1st April 2005	M (GVW ≤ 2500 or upto 6 seater)	-	-	1.00	0.70	0.08
	N1 & M (GVW>2500 or above 6 seater)	I	RM ≤ 1250	1.00	0.70	0.08
		II	1250<RM≤1700	1.25	1.00	0.12
		III	1700< RM	1.50	1.20	0.17

DRIVING CYCLES
Type I Test

1. Modified Indian Driving Cycle - For BSIII and BS IV (Bharat stage Norms)



Total test time: 1180 sec

Total distance: 10.647 km

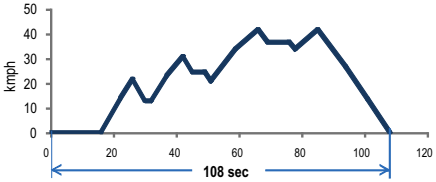
Max. speed: 90 km/h

Maximal Acceleration: 0.833 m/s^2

Maximal Deceleration:1.389 m/s^2

Note: BS I and BS II : 40 sec Idle will be added to cycle at start (Total test time:1220 sec)

2. Indian Driving Cycle for 4W (1991, 92, 96 & 98 Norms)



Cold Start

6 sample cycles (108 sec each)

Total Test Time :	648 sec
Total Distance :	3.948
Max speed :	42 kmph
Maximal Acceleration :	0.65 m/s^2
Maximal Deceleration :	0 .63 m/s^2

Dual Fuel Diesel – CNG Engine



ARAI upgraded an existing SUV diesel engine to operate on diesel-CNG dual fuel mode. Dual fuel engine was optimized on chassis dynamometer. Diesel replacement was achieved in the range of 20 – 60% and average diesel consumption reduced by 5%.

Tractor Engine Design & Development (for an Indian OEM)



ARAI designed and developed a new 4 Cylinder Tractor Diesel Engine from clean sheet for an Indian OEM to meet US EPA Tier-4 (MY 2013) Off-road Emission Norms. The emissions are met without DPF and SCR.

Tractor Engine Design & Development (for an Overseas OEM)



ARAI is designing and developing a family of new Tractor Diesel Engines from clean sheet for an overseas OEM to meet basically Tier3 emission norms with future upgradability to US EPA Tier-4 and Tier 5 Off-road Emission levels. Tier 3 emissions have been demonstrated on initial prototype engine for one configuration

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The Emission Standards for Bharat Stage VI (BS-VI)

for category M and N vehicles having Gross Vehicle Weight exceeding 3500kg., manufactured on or after 1st April 2020 for all models, as per GSR. 889(E) dt. 16th Sept 2016

Limit values for M&N category vehicles : BS-VI

	Limit values							
	CO mg/kWh	THC mg/kWh	NMHC mg/kWh	CH_4 mg/kWh	NOx mg/kWh	NH_3 (ppm)	PM mass mg/kWh	PM number (numbers/kWh)
WHSC (CI)	1500	130	—	—	400	10	10	$8.0x10^{11}$
WHTC (CI)	4000	160	—	—	460	10	10	$6.0x10^{11}$
WHTC (PI)	4000	–	160	500	460	10	10	$6.0x10^{11}$

Notes :
PI = Positive Ignition
CI = Compression Ignition

Deterioration Factors for BS-VI

Test cycle	CO	THC[1]	NMHC[2]	CH_4[2]	NOx	NH_3	PM mass	PM number
WHTC	1.3	1.3	1.4	1.4	1.15	1.0	1.05	1.0
WHSC	1.3	1.3	–	–	1.15	1.0	1.05	1.0

(1)Applies in case of a compression ignition engine.
(2)Applies in case of a positive ignition engine.

BSVI - OBD - I threshold for BS VI vehicles manufactured on or after 1st April 2020

	Limit in mg / kWh	
	NOx	PM Mass
Compression ignition engines	1500	Performance Monitoring (1)
Positive ignition engines	1500	—

(1) Performance Monitoring for wall - flow diesel particulate filter shall be as per AIS 137 and as amended time to time

BS-VI-OBD -II threshold for BS VI vehicles manufactured on or after 1st April 2023

	Limit in mg / kWh		
	NOx	PM Mass	CO
Compression ignition engines	1200	25	—
Positive ignition engines	1200	—	7500

World Not-To-Exceed (WNTE) Off-cycle laboratory testing limits for gaseous and particulate exhaust emissions.

Test cycle	CO mg/kWh	THC mg/kWh	NOx mg/kWh	PM mg/kWh
WNTE	2000	220	600	16

Applicability of Test Requirements for BS-VI

	Positive-ignition engines					Compression-ignition engines			Dual fuel engines
	Gasoline (E5)	CNG / Bio-methane/ Bio-Gas/LNG	LPG	E85	HCNG (Hydrogen + CNG)	Diesel (B7)	Ethanol (ED95)	Biodiesel blends up to 100% (1)	Diesel + (CNG/LNG)
Gaseous pollutants	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes(2)
Particulate Mass	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes(2)
PM number	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes(2)
Durability	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes(2)
OBD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes(2)
Off Cycle Emissions (WNTE)	--	--	--	--	--	Yes	Yes	Yes	Yes(2)
PEMS Demonstration test at Type Approval	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes(2)
In-Service Conformity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes(2)

(1) The vehicles/ engines fuelled with bio diesel blends up to 7% shall be tested with reference diesel (B7) and vehicles fuelled with Bio diesel blends above 7% will be tested with respective blends.

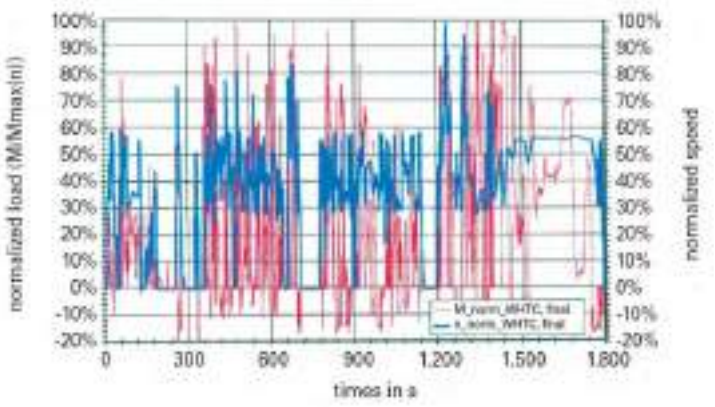
(2) The test applicability requirements for dual fuel engine is depending on the Gas Energy Ratio (GER) measured over the hot part of the WHTC test-cycle. GER classification shall be as per AIS 137 and as amended from time to time.

Minimum Service Accumulation Period - BS-VI

Category of vehicle in which engine will be installed	Useful Life Period	Minimum service accumulation period
Category N1 vehicles	1,60,000 km or 5 years	1,60,000 km
Category N2 vehicles	3,00,000 km or 6 years	1,88,000 km
Category N3 Vehicles with GVW equal to or less than 16,000 kg	3,00,000 km or 6 years	1,88,000 km
Category N3 Vehicles with GVW above 16,000 kg	7,00,000 km or 7 years	2,33,000 km
Category M2 vehicles	1,60,000 km or 5 years	1,60,000 km
Category M3 Vehicles with GVW equal to or less than 7,500 kg	3,00,000 km or 6 years	1,88,000 km
Category M3 Vehicles with GVW above 7,500 kg	7,00,000 km or 7 years	2,33,000 km

WHTC - World Heavy Duty Transient Cycle

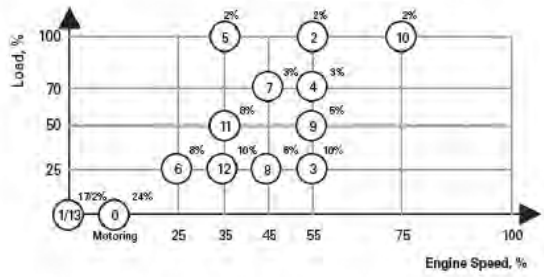
It is a second by second sequence of normalized speed and torque values



WHSC: World Heavy Duty Steady-State Cycle

WHSC - World Heavy Duty Steady-State Cycle
It consists of a number of speed and power modes which cover the typical operating range of HD engines

Idle mode is separated in 2 modes : Mode 1 : at the beginning of test cycle
Mode 13 : at the end of test cycle



Mode	Normalized Speed (%)	Normalized Torque (%)	Mode Length(s) incle .20 s Ramp
1	0	0	210
2	55	100	50
3	55	25	250
4	55	70	75
5	35	100	50
6	25	25	200
7	45	70	75
8	45	25	150
9	55	50	125
10	75	100	50
11	35	50	200
12	35	25	250
13	0	0	210
sum			1895

Notes :

- In case of vehicles equipped with Compression Ignition engines, the gaseous and particulate emissions shall be measured as per WHSC and WHTC cycles as per procedure described in AIS 137 as amended from time to time
- In case of vehicles equipped with positive Ignition engines, the gaseous and particulate emissions shall be measured as per WHTC cycle as per procedure described in AIS 137 as amended from time to time
- For CI engine vehicles, the emission of visible pollutants (smoke) shall not exceed the limit value of smoke density, page no 75. These smoke limits are without correction factor and engines are to be tested with conditioned air supplied to the engine to maintain atmospheric factor of 0.98 to 1.02.

Engine Net Power Measurement Tolerance

Engine Type	Engine Type	Rated net power(%)	Other measurement points on the curve (%)	Tolerance for engine speed (%)
Type Approval	All	±2	±4	±2
Conformity of production	All	±5	±10	±5

Note : The engine power shall be measured on engine dynamometer and the measured power shall conform to the power, specified and tested ap per procedure prescribed in AIS 137 as amended time to time.

- Idle Emissions:

  (a) The vehicles equipped with PI engine : Page No. 75

  (b) The vehicles equipped with CI engine : Page No. 76

- (a) During type approval and COP applicable from 1st April, 2020, emission measurement on vehicles using PEMS shall be carried out on road for data collection and from 1st April, 2023 in-service conformity factor shall be applicable. The detailed procedure is laid down in AIS137 and as amended from time to time

  (b) The type approval vehicle used for the PEMS demonstration test shall be representative for the vehicle category intended for the installation of the engine system. The vehicle may be a prototype vehicle or an adapted production vehicle.

  (c) For PEMS demonstration test at type approval, vehicle shall meet the requirements of in-service compliance from 1st April, 2023.

- The vehicles manufactured on or after 1st April, 2023 shall have the capability of assessing the in-use performance of on-board diagnostic, as per procedure laid down in AIS 137 and as amended time to time.

Emission Standards for Heavy Duty Commercial Engines

Heavy Duty Vehicles (GVW > 3500 kg)

	Effective date	Category	Test cycle	CO (g/kWh)	THC (g/kWh)	NOx (g/kWh)	NMHC (g/kWh)	CH4 (g/kWh)	PM[a] (g/kWh)	ELR smoke (m^{-1})[a]	Free accl. smoke (m^{-1})[a]
Diesel, CNG or LPG Engines	1.04.05 BS-III	Diesel, CNG or LPG vehicles with GVW >3500	Engine Steady state cycle (ESC)	2.10	0.66	5.00	NA	NA	0.10 / 0.13[b]	0.80	2.45
		Diesel , CNG or LPG vehicles with GVW >3500 with advanced exhaust after treatment system	Engine Transient Cycle (ETC)	5.45	0.78	5.00	NA	NA	0.16/ 0.21[b]	0.80	2.45
	1.04.10 BS-IV	Only Diesel vehicles with GVW >3500	Engine Steady state cycle (ESC)	1.50	0.46	3.50	NA	NA	0.02	0.50	1.62
		Diesel, CNG or LPG vehicles with GVW >3500	Engine Transient Cycle (ETC)	4.00	-	3.50	0.55[c]	1.10[d]	0.03	NA	NA

a - Only for Diesel Engines.
b - For engines having swept vol. <0.75 liter per cylinder & rated power speed >3000 rpm.
c - A manufacturer may choose to measure the mass of THC instead of NMHC
d - Only for CNG vehicles.

For BS IV

2010.04	NCR,13 cities
2015.07	Above plus 29 cities mainly in the states of Haryana, Uttar Pradesh, Rajasthan and Maharashtra
2015.10	North India plus bordering districts of Rajasthan(9 states)
2016.04	Western India plus parts of south and East India
2017.04	Nationwide

Deterioration Factor

i) Vehicle manufacture may opt for fixed deterioration factor

Engine Type	Test Cycle	CO	HC	NMHC	CH4	NOx	PM
Diesel Engine	ESC	1.1	1.05	----	----	1.05	1.1
Diesel Engine	ETC	1.1	1.05	----	----	1.05	1.1
CNG,LPG or Gaseous fulled engine	ETC	1.1	1.05	1.05	1.2	1.05	----

ii) Alternatively, vehicle manufacture may opt for evaluation of deterioration factor by minimum service accumulation period

Category of vehicle	Min. service accumulation period in km
Category N1 vehicles	100000
Category N2 vehicles	125000
Category N3 vehicles with GVW ≤ 16000kg	125000
Category N3 vehicles with GVW > 16000kg	167000
Category M2 vehicles	100000
Category M3 vehicles with GVW ≤ 7500kg	125000
Category M3 vehicles with GVW > 7500kg	167000

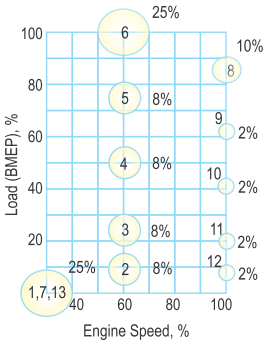
Heavy Duty Vehicles (GVW>3500 kg) Emission Regulation History

	Effective date	CO (g/kWh)	THC (g/kWh)	NOx (g/kWh)	PM (g/kWh)[d]	Free accl. smoke (m^{-1})	Remarks
Diesel, CNG or LPG Engines	1.4.1991 -1.4.1992 (1991 -1992 Norms)	14.00	3.50	18.00	NA	2.45	Exhaust gas opacity standard was effective from 01.04.1991
	1.4.1996 (1996 Norms)	11.20	2.40	14.40	NA	2.45	
	1.4.2000 (BS-I)	4.50	1.10	8.00	0.36 [a]	2.45	For diesel vehicles with GVW >3500
		4.50	1.10	8.00	0.36 [b]		For diesel vehicles with GVW ≤ 3500
					0.61 [c]		
	24.10.01 in NC Territory of Delhi (BS-II)	4.00	1.10	7.00	0.15	2.45	For diesel vehicles with GVW >3500 & For diesel vehicles with GVW ≤ 3500

a- For engines with power exceeding or not exceeding 85 kw.
b- For engines with power exceeding 85 kw.
c- For engines with power equal to or less than 85 kw.
d- Only for Diesel engines

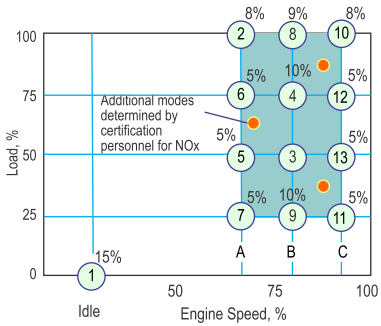
Test Cycles

Indian 13 Mode Emission Cycle (BS-I & BS-II)



Mode No.	Speed	Load %	Weighting Factors
1	idle	--	0.25/3
2	Maximum torque speed	10	0.08
3		25	0.08
4		50	0.08
5		75	0.08
6		100	0.25
7	idle	--	0.25/3
8	Rated power speed	100	0.1
9		75	0.02
10		50	0.02
11		25	0.02
12		10	0.02
13		--	0.25/3

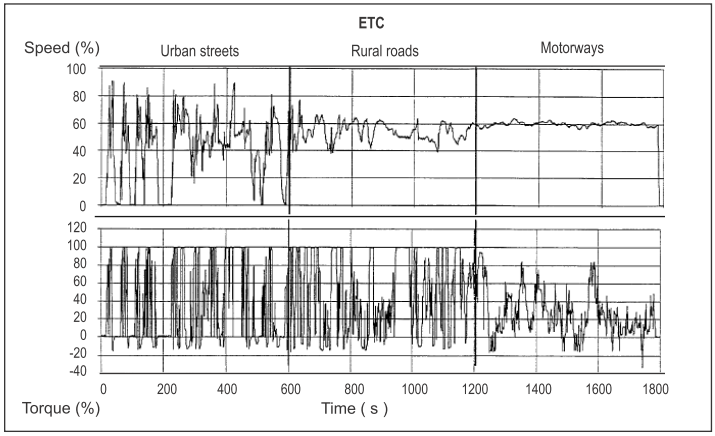
Engine Steady state cycle (ESC) (BSIII & BSIV)



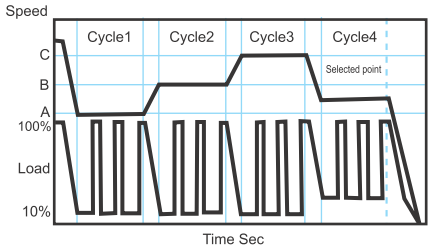
Mode No.	Speed	Load %	Weight Factors
1	Low idle	0	15
2	A	100	8
3	B	50	10
4	B	75	10
5	A	50	5
6	A	75	5
7	A	25	5
8	B	100	9
9	B	25	10
10	C	100	8
11	C	25	5
12	C	75	5
13	C	50	5

Engine Transient Cycle (ETC) (BS - III & BS - IV)

ETC Dynamometer Schedule



ELR Test Sequence (BS - III & BS - IV)



Prototype of Real-time Simulator



Laboratory level prototype of Real-time Simulator for EV / HEV systems

Portable on-board driver's aid system 'SAARATHI-OTG' (SAARTHI – On The Go)



This is a portable system which can be fitted on the vehicle dash board and run on 12 V DC power supply from vehicle battery. The system is easy to use and any drive cycle / pattern can be programmed using simple tools like MS Excel.

Battery Health Monitoring System



This BHMS has varied applications ranging from traction batteries, SLI batteries, UPS/inverter batteries, etc. It can be integrated on the battery, to monitor and evaluate battery performance & use pattern in terms of voltage, current, abuse, etc

Emission Standards For CNG & LPG Driven Vehicles

I) Mass emission standards for vehicles when operating on CNG shall be same as are applicable for gasoline vehicles with the exception that HC shall be replaced by NMHC, where NMHC= 0.3 x HC

II) Mass emission standards for vehicles when operating on LPG shall be same as are applicable for gasoline vehicles with the exception that HC shall be replaced by RHC, where RHC= 0.5 x HC

III) Crank case emission and SHED test are not applicable in CNG/LPG mode.

IV) Applicable emission norms for CNG & LPG driven vehicle

Category	Applicable Emission Norms
OE CNG / LPG Category M and Category N Vehicles with GVW ≤ 3500kg, 3 wheelers and 2 wheelers	Prevailing gasoline norms *
CNG / LPG Category M and Category N Vehicles with GVW ≤ 3500kg, 3 wheelers and 2 wheelers retro fitment from Gasoline	Prevailing gasoline norms
CNG / LPG Category M and Category N Vehicles with GVW ≤ 3500kg, 3 wheelers and 2 wheelers retro fitment from Diesel	Prevailing diesel norms**
CNG / LPG Category M and Category N Vehicles with GVW > 3500kg, manufactured upto1st April 2010	Prevailing diesel engine norms based on 13-mode steady-state engine dynamometer test or 13 -mode Engine steady state cycle as applicable **
CNG / LPG Category M and Category N Vehicles with GVW > 3500kg, manufactured on and from 1st April 2010	Prevailing diesel engine norms **

* - Vehicle having option for bi-fuel operation and fitted with limp-home gasoline tank of capacity not exceeding 2 liters, 3 liters and 5 liters respectively on 2W, 3W and 4W are exempted from emission test, crankcase emission test and SHED test in gasoline mode.

** - PM limit is not applicable



Analyze Vehicle Response for :
Damper Evaluation
Suspension Optimization
Ride and Handling

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Mass Emission Standards for Diesel driven Agricultural Tractor, Construction Equipment Vehicle and Combine Harvester

As per GSR: 201(E) dt. 5th March 2018

Applicable emission limit for NRSC and NRTC test cycle (Bharat (Non-road) Stage IV)

Category, kW	Applicable with effect from	CO	HC	NOx	PM	Test Cycle*
		g/ kWh				
37 ≤ P < 56	1st October 2020	5.0	4.7 (HC+NOx)		0.025	NRSC & NRTC
56 ≤ P < 130	1st October 2020	5.0	0.19	0.4	0.025	
130 ≤ P < 560	1st October 2020	3.5	0.19	0.4	0.025	

*Test Cycle as describe in AIS: 137 and as amended from time to time.

Engine Test: To Determine Deterioration factor

Category (Power Band)	Emission durability period (hours)
≤ 37kW (constant speed Engines)	3000
≤ 37kW (Variable speed Engines)	5000
> 37 kW	8000

Engine manufacturers may select to use the following assigned multiplicative DFs.

Test cycle	CO	HC	NOx	PM
NRSC	1.3	1.3	1.15	1.05
NRTC	1.3	1.3	1.15	1.05

Applicable emission limit for NRSC and NRTC test cycle (Bharat (Non-road) Stage V)

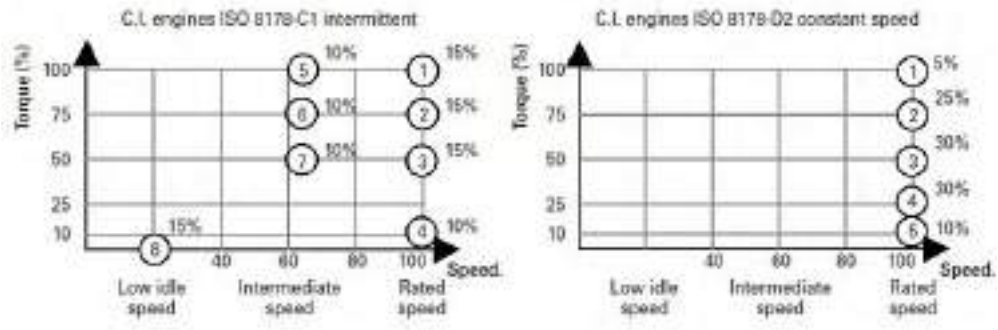
Category, kW	Applicable with effect from	CO	HC	NOx	PM	PN	Test Cycle
		g/kWh				#/kWh	
P < 8	1st April 2024	8.0	7.5 (HC+NOx)		0.4	—	NRSC
8 ≤P < 19	1st April 2024	6.6	7.5 (HC+NOx)		0.4	—	
19 ≤P < 37	1st April 2024	5.0	4.7 (HC+NOx)		0.015	1×10^{12}	NRSC and NRTC
37 ≤P < 56	1st April 2024	5.0	4.7 (HC+NOx)		0.015	1×10^{12}	
56 ≤P < 130	1st April 2024	5.0	0.19	0.4	0.015	1×10^{12}	
130 ≤P < 560	1st April 2024	3.5	0.19	0.4	0.015	1×10^{12}	
P≥ 560	1st April 2024	3.5	0.19	3.5	0.045	—	NRSC

Tolerance for gross power measurement

Engine Type	Rated power (%)	Other measurement points	Tolerance for engine
		on the curve (%)	speed (%)
Type approval	± 2	± 4	± 1.5
Conformity of production	± 5	± 10	± 5

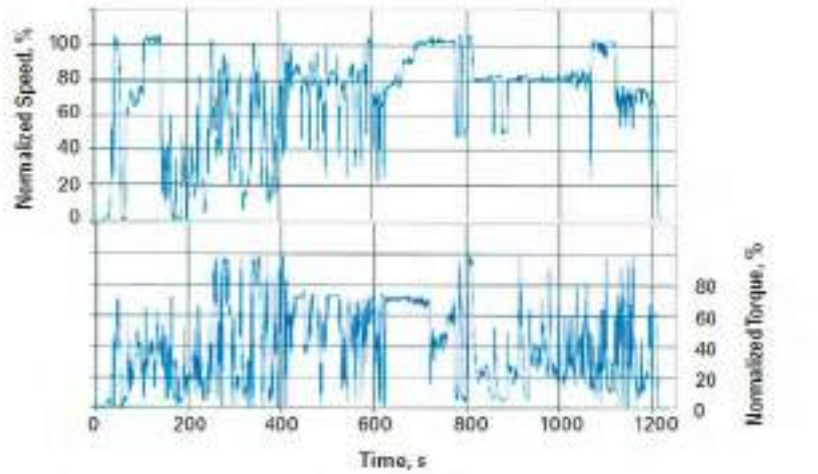
Note: The Vehicles specified under this rule and manufactured after the 1st April 2026 shall be monitored for gaseous pollutants emission from in-service internal combustion engines installed on vehicles, as per procedure laid down in AIS: 137 and as amended from time to time.

NRSC (Non Road Steady State Cycle)



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NRTC (Non Road Transient Cycle)



Off Road Vehicles / Engines - Diesel

I) Emission Standards for Agricultural Tractor

Bharat Stage Norms	Category	Effective date	Test cycle	CO (g/kWh)	HC (g/kWh)	NOx (g/kWh)	HC + NOx (g/kWh)	PM (g/kWh)	80% of full load smoke (m^{-1})
-	-	01.10.1999	ISO 8178-4 "C1" 8 mode cycle	14.00	3.50	18.00	-	-	3.25
-	-	28.07.2000	ISO 8178-4 "C1" 8 mode cycle	14.00	3.50	18.00	-	-	3.25
Trem II	-	01.06.2003	ISO 8178-4 "C1" 8 mode cycle	9.00	-	-	15.00	1.00	3.25
Trem III	-	01.10.2005	ISO 8178-4 "C1" 8 mode cycle	5.50	-	-	9.50	0.80	3.25
Trem III A	kW<8	01.04.2010	ISO 8178-4 "C1" 8 mode cycle	5.50	-	-	8.50	0.80	3.25
	8 ≤ kW<19			5.50	-	-	8.50	0.80	
	19 ≤ kW<37			5.50	-	-	7.50	0.60	
	37 ≤ kW<56	01.04.2011		5.00	-	-	4.70	0.40	
	56 ≤ kW<75			5.00	-	-	4.70	0.40	
	75 ≤ kW<130			5.00	-	-	4.00	0.30	
	130 ≤ kW<560			3.50	-	-	4.00	0.20	

The durability of engine is determined either by an actual durability run as per below table on engine dynamometer or by application of a fixed deterioration factor

Category (Power Band)	Useful life (hrs) (Emission Durability Period)
<19kW	3000
19< kW ≤ 37	5000
>37kW	8000

Fixed Deterioration Factor

CO	HC	NOx	PM
1.1	1.05	1.05	1.1

II) Emission Standards for Diesel Driven Power Tiller

Bharat Stage Norms	Category	Effective date	Test cycle	CO (g/kWh)	HC + NOx (g/kWh)	PM (g/kWh)	80% of full load smoke (m^{-1})
Trem II	-	01.10.2006	ISO 8178-4 "C1" 8 mode cycle	9.00	15.00	1.00	3.25
Trem III	-	01.04.2008	ISO 8178-4 "C1" 8 mode cycle	5.50	9.50	0.80	3.25

III) Emission Standards for Gasoline driven Power Tiller, Gasoline Driven Multi-utility Industrial Power Sweeper and Gasoline Driven Agriculture Tractor

Bharat Stage Norms	Category	Effective date	Test cycle	CO (g/kWh)	HC + NOx (g/kWh)
BS III	Power tiller	01.07.2013	ISO 8178-4 "C1" 8 mode cycle	14	24
BS III	Multi-utility Industrial power sweeper and agriculture tractor	01.10.2014	ISO 8178-4 "C1" 8 mode cycle	14	24

Emission Standards for Construction Equipment Vehicle (CEV)

Bharat Stage Norms	Category	Effective date	Test cycle	CO (g/kWh)	HC (g/kWh)	NOx (g/kWh)	HC+NOx (g/kWh)	PM (g/kWh)	80% of full load smoke (m^{-1})
-	-	18.01.96	ISO 8178-4 "C1" 8 mode cycle	14.00	3.50	18.00	-	-	3.25
-	-	28.07.00	ISO 8178-4 "C1" 8 mode cycle	14.00	3.50	18.00	-	-	3.25
BS-II	kW<8	01.10.08	ISO 8178-4 "C1" 8 mode cycle for Variable Speed Engines or	8.00	1.30	9.20	-	1.00	3.25
	8 ≤ kW<19			6.60	1.30	9.20	-	0.85	
	19 ≤ kW<37	01.10.07		6.50	1.30	9.20	-	0.85	
	37 ≤ kW<75		ISO 8178-4 "D2" 5 mode cycle for Constant Speed Engines	6.50	1.30	9.20	-	0.85	
	75 ≤ kW<130			5.00	1.30	9.20	-	0.70	
	130 ≤ kW<560			5.00	1.30	9.20	-	0.54	
BS-III	kW<8	01.04.2011	ISO 8178-4 "C1" 8 mode cycle for Variable Speed Engines or	8.00	-	-	7.50	0.80	3.25
	8 ≤ kW<19			6.60	-	-	7.50	0.80	
	19 ≤ kW<37			5.50	-	-	7.50	0.60	
	37 ≤kW<75		ISO 8178-4 "D2" 5 mode cycle for Constant Speed Engines	5.00	-	-	4.70	0.40	
	75 ≤kW<130			5.00	-	-	4.00	0.30	
	130 ≤kW<560			3.50	-	-	4.00	0.2	

Category (Power Band)	Useful life (hrs) (Emission Durability Period)
<19kW	3000
19 < kW ≤ 37 (constant speed)	3000
19 < kW ≤ 37 (variable speed)	5000
> 37kW	8000

Fixed Deterioration Factor

CO	HC	NOx	PM
1.1	1.05	1.05	1.1

The durability of engine is determined either by an actual durability run as per below table on engine dynamometer or by application of a fixed deterioration factor

Emission Standards for Genset Application
as per GSR 281(E) dt. 7th march 2016

Genset Application : Dedicatedly NG or LPG driven Engine (Up to 800 kW)

Power Category	Date of Implementation	CO (g/kW-hr)	NOx + NMHC or NOx + RHC (g/kW-hr)	Test Cycle
Upto 19 kW	1st July 2016	≤ 3.5	≤7.5	D1 – 3 mode Cycle Specified Under ISO – 8178 – Part 4
More than 19 kW upto 75 kW		≤3.5	≤4.7	
More than 75 kW upto 800 kW		≤3.5	≤4.0	

Genset Application : Petrol and NG or Petrol and LPG (Up to 19 kW) Powered by SI Engines (up to 400 CC)

Class	Date of Implementation	Engine Displacement (cc)	CO (g/kWh)	NOx + THC+ NOx + NMHC+ NOx + RHC (g/kWh)	Test Cycle
1	1st August 2016	Upto 99	≤ 250	≤ 12	D1 – 3 mode Cycle Specified Under ISO – 8178 –Part 4
2		>99 and upto 225	≤ 250	≤ 10	
3		> 225 ≤ 400	≤ 250	≤ 8	

Genset run on Diesel and Natural Gas (NG) or Diesel and Liquid Petroleum Gas (LPG) (Up to 800 kW)

Power Category	Date of Implementation	NOx + THC or NOx + NMHC or RHC (g/kWh)	CO (g/kWh)	PM	Smoke Limit (M^{-1})	Test Cycle
Upto 19 kW	1st July 2016	≤7.5	≤3.5	≤0.3	≤0.7	D2 – 5 mode Cycle Specified Under ISO – 8178 – Part 4
More than 19 kW upto75 kW		≤ 4.7	≤3.5	≤0.3	≤0.7	
More than 75 kW upto 800 kW		≤ 4.0	≤3.5	≤0.2	≤0.7	

Note: The emission standards for smoke and particulate matter shall be applicable, when diesel is used as fuel. Smoke limit prescribed in above Table shall not exceed throughout the operating load points of the test cycle

Emission Standards for Generator Sets
Generator Sets (upto19 kilowatt) run on Petrol and Kerosene

Displacement (CC)	Date of implementation	CO (g/kW-hr)		HC + NOx (g/kW-hr)		Test Cycle
		2 - Stroke engine	4 - Stroke engine	2 - Stroke engine	4 - Stroke engine	
≤ 65	01.06.2000	603	623	166	65	D1 -3 mode Cycle specified under ISO-8178-Part 4
> 65 ≤ 99		-	623	-	36	
>99 ≤ 225		-	623	-	19.3	
> 225		-	623	-	16.1	
≤ 65	01.06.2001	519		54		
> 65 ≤ 99		519		30		
>99 ≤ 225		519		16.1		
> 225		519		13.4		
≤ 99	01.08.2014	250		12		D1-3 mode Cycle specified under ISO-8178-Part 4
> 99 ≤ 225		250		10		
> 225		250		8		

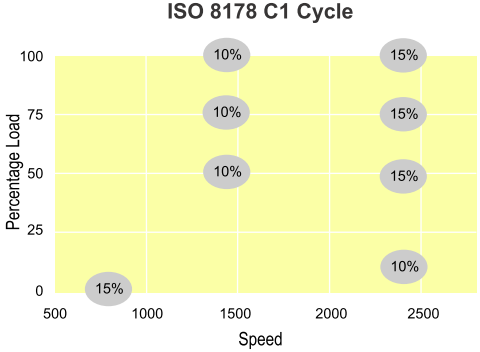
Diesel Engines up to 800 kW, for Gensets Applications

Power Category	Date of implementation	NOx (g/kW-hr)	THC (g/kW-hr)	NOx+THC (g/kW-hr)	CO (g/kW-hr)	PM (g/kW-hr)	Smoke (m^{-1}) at full load	Test Cycle
≤19 kW	1.7.2003	9.20	1.30	–	5.00	0.60	0.70	D2 - 5mode Cycle specified under ISO 8178 Part 4
	1.7.2004	9.20	1.30	–	3.50	0.30	0.70	
> 19 kW ≤ 50kW	1.7.2003	9.20	1.30	–	5.00	0.50	0.70	
	1.7.2004	9.20	1.30	–	3.50	0.30	0.70	
> 50 kW ≤ 260kW	1.7.2003	9.20	1.30	–	3.50	0.30	0.70	
> 260 kW ≤ 800kW	1.7.2004	9.20	1.30	–	3.50	0.30	0.70	
≤19 kW	1.7.2005	9.20	1.30	–	3.50	0.30	0.70	
>19 kW ≤176 kW	1.7.2004	9.20	1.30	–	3.50	0.30	0.70	
>176 kW ≤ 800 kW	1.11.2004	9.20	1.30	–	3.50	0.30	0.70	
≤ 19kw	1.07.2014	–	–	7.5	3.5	0.3	0.7*	D2 - 5mode Cycle specified under ISO 8178 Part 4
> 19kw ≤ 75kw	1.07.2014	–	–	4.7	3.5	0.3	0.7*	
> 75kw ≤ 800kw	1.07.2014	–	–	4.0	3.5	0.2	0.7*	

Note: 1) * Smoke shall not exceed above value throught the operating load of the test cycle

Test Cycles for Agriculture Tractors, CEV, Power Tiller Vehicles and Genset Engines

ISO 8178-4 "C1" 8 Mode Cycle



ISO 8178 Cycles

Mode number	1	2	3	4	5	6	7	8	9	10	11
Torque %	100	75	50	25	10	100	75	50	25	10	0
Speed	Rated speed					Intermediate speed					Low idle
Off-road vehicles											
Type C1	0.15	0.15	0.15	-	0.10	0.10	0.10	0.10	-	-	0.15
Constant speed											
Type D1	0.30	0.50	0.20								
Type D2	0.05	0.25	0.30	0.30	0.10	-	-	-	-	-	-

Cycle C1 –Diesel powered, Agricutural tractor, Power tiller & CEV (variable speed)
Cycle D1 –Petrol & Kerosene powered Gensets
Cycle D2 –Diesel powered CEV (constant speed) & Gensets

Conformity of Production

2 Wheeler & 3 Wheeler (BS-II,BS-III,BS-IV & BS-VI) and Quadricycle (BS-IV)

Type of Vehicle	Annual Production / Import		COP Frequency	COP Sample
	Exceeding	Upto		
2,3 Wheeler and Quadricycle	250 per 6 months	10000 per year	Once every year	3
2 Wheeler	10000 per year	150000 per 6 months	Once every 6 months	3
2 Wheeler	150000 per 6 months	---	Once every 3 months	3
3 Wheeler and Quadricycle	10000 per year	75000 per 6 months	Once every 6 months	3
3 Wheeler and Quadricycle	75000 per 6 months	----	Once every 3 months	3

Note: For Quadricycle where the production of volume in 6 months is less than 250 per model including its variant the provisions contained in the provisos to rule 126A shall apply.

4 Wheeler Vehicles & Heavy Duty Engines greater than 3500 kg GVW

Category	COP Frequency	COP Sample
BS II*	Every 6 Months	1
BSIII**, BS IV **,BS VI**	Yearly	3

*In case of vehicle / engine model and its variants produced/imported are less than 5000 in any consecutive period of six months in a year, COP interval shall be one year.

**In case of vehicle / engine model and its variants produced/imported are less than 250 in any consecutive period of six months in a year, one vehicle / engine shall be tested for COP yearly

Agricultural Tractor, Power Tiller & CEV Engines

Category	COP Frequency	COP Sample
Annual production upto 200 Per Family/model	Once in 2 years	1
Annual production exceeding 200 Per Family/model	Once in Every Year	1

Conformity of Production

Genset

Category		COP Frequency	COP Sample
1. Domestically manufactured engines of more than 19 kW rated output		Once for every 1000 units, or once a year, whichever is earlier	1 per 1000 units
2. Imported engines of all ratings		Once for every 1000 units, or once a year, whichever is earlier	1 per 1000 units
3. Domestically manufactured engines of upto19 kW rated output			
Total No. of families	No.of families to be tested		
1 ~ 3	1	Once every year	4
4 ~ 7	2	Once every year	8
8 ~ 11	3	Once every year	12
12 ~ 15	4	Once every year	16
>15	5	Once every year	20

Emission Control From In-Use Vehicles

Pollution Under Control (PUC) Tests:

- Idle CO HC Emission Test for Gasoline vehicles

PETROL/CNG/LPG DRIVEN VEHICLES

PUC Tests – Revised Norms from 1st October 2014

Vehicle Type	CO (vol%)	HC (ppm)
Two wheelers (2/4 -stroke) (Vehicles manufactured on and before 31st March 2000)	4.5	9000
Two wheelers (2 -stroke) (Vehicles manufactured between 31st March 2000 and 31st March 2010)	3.5	6000
Two wheelers (4 -stroke) (Vehicles manufactured between 31st March 2000 and 31st March 2010)	3.5	4500
Two wheelers (2 -stroke) (Vehicles manufactured after 31st March 2010)	3.0	4000
Two Wheelers (4 - Stroke) (Vehicles manufactured after 31st March, 2010)	3.0	3000
Three Wheelers (2/4 - Stroke) (Vehicles manufactured on and before 31st March, 2000)	4.5	9000
Three Wheelers (2 - Stroke) (Vehicles manufactured after 31st March, 2000)	3.5	6000
Three Wheelers (4 - Stroke) (Vehicles manufactured after 31st March, 2000,	3.5	4500
Four Wheelers manufactured as per pre-Bharat Stage II emission norms	3.0	1500
Four Wheelers manufactured as per Bharat Stage-II or Bharat Stage-III Emission norms	0.5	750

For CNG Vehicles, NMHC = 0.3 x HC; For LPG Vehicles, RHC = 0.5 x HC

Emission Control From In-Use Vehicles

Pollution Under Control (PUC) Tests:

Diesel Vehicles

- Free Acceleration Smoke test for Diesel vehicles

Free acceleration test for turbo charged engine and naturally aspirated engine complying BSIII and below norms	65 HSU (2.45 m^{-1})
Free acceleration test for turbo charged engine and naturally aspirated engine complying BSIV and above norms	50 HSU (1.62 m^{-1})

PUC Tests – BS-IV compliant 4 wheelers

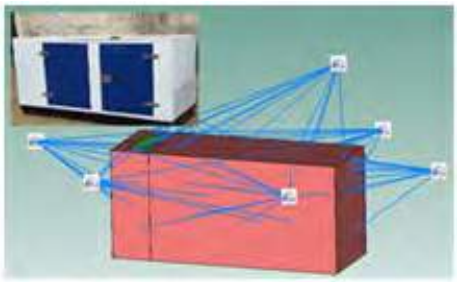
Vehicle Type	Idle		High Idle	
	CO (vol%)	HC (ppm)	CO (vol%)	Lamda (2500+/-200 rpm)
BS-IV compliant 4 Wheeler Petrol Vehicle	0.3	200	0.2	1+/ - 0.03
BS-IV compliant 4 Wheeler CNG/LPG Vehicle	0.3	200	–	--
BS-IV compliant 4 Wheeler Diesel Vehicles	50 HSU (1.62 m^{-1})			

Limits for smoke Density

Nominal Flow G(½)	Light Absorption K(1/m)	Nominal Flow G(½)	Light Absorption K(1/m)
42	2.26	120	1.37
45	2.19	125	1.345
50	2.08	130	1.32
55	1.985	135	1.30
60	1.90	140	1.27
65	1.84	145	1.25
70	1.775	150	1.205
75	1.72	160	1.19
80	1.665	165	1.17
85	1.62	170	1.155
90	1.575	175	1.14
95	1.535	180	1.125
100	1.495	185	1.11
105	1.465	190	1.095
110	1.425	195	1.08
115	1.395	200	1.065

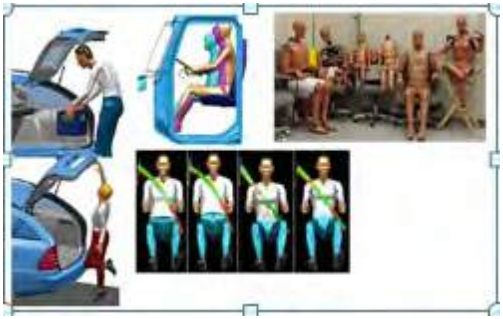
Note: The Smoke Limits are without correction factors and engines are to be tested with conditioned air supplied to the engine to maintain atmospheric factor of 0.98 to 1.02.

Acoustic Enclosure Design using SEA



ARAI has developed capability for SEA based high frequency noise simulations aided by conventional CAE tools to provide much needed complete frequency range solutions for automotive and non-automotive applications.

SIZE INDIA – Anthropometrical Data of Indian Driving Population



This is one of the largest anthropometric survey in India for civilian population. It has Anthropometric measurements of more than 5000 people, more than 100 body dimensions along with 3-D surface data for every subject . a comprehensive report providing detailed analysis of Size India Survey is available

BS VI Petrol (E5)

Parameter	Unit	Limits1		Test method
		Minimum	Maximum	
Research octane number, RON		95.0	--	EN25164/prENISO5164
Motor octane number, MON		85.0	–	EN25163/prENISO5163
Density at 15°C	kg/m^3	743	756	ENISO 3675/ENISO12185
Vapour pressure	kPa	56.0	60.0	ENISO 13016-1(DVPE)
Water content	%v/v		0.015	ASTME 1064
Distillation:				
–Evaporated at 70°C	%v/v	24.0	44.0	ENISO 3405
–Evaporated at 100°C	%v/v	48.0	60.0	ENISO 3405
–Evaporated at 150°C	%v/v	82.0	90.0	ENISO 3405
–Final boiling point	°C	190	210	ENISO 3405
Residue	%v/v	__	2.0	ENISO 3405
Hydro-carbon analysis:				
–Olefins	% V/V	3.0	13.0	ASTMD 1319
–Aromatics	% V/V	29.0	35.0	ASTMD 1319
–Benzene	% V/V	--	1.0	EN 12177
–Saturates	% V/V	Report		ASTM 1319
Carbon/hydrogen ratio		Report		
Carbon/oxygen ratio		Report		
Induction period [2]	minutes	480		ENISO 7536
Oxidation content [4]	%m/m	Report		EN1601
Existent gum	mg/m1	–	0.04	ENISO 6246
Sulphur content [3]	mg/kg	–	10	ENISO 20846/ENISO20884
Copper corrosion		–	Class 1	ENISO 2160
Lead content	mg/1	–	5	En237
Phosphorus content	mg/1	–	1.3	ASTMD 3231
Ethanol[5]	% V/V	4.7	5.3	EN 1601 / EN 13132

1 The values quoted in the specifications are "truevalues". For establishing the limit values, the terms of ISO4259:2006 (Petroleum products— Determination and application of precision data in relation to methods of test) have been applied and for fixing a minimum value, a minimum difference of 2 R above zero has been taken into account; for fixing a maximum and minimum value, the minimum difference is 4R (R=reproducibility). Notwithstanding this measure, which is necessary for technical reasons, the fuel manufacturer shall nevertheless aim at a zero value where the stipulated maximum value is 2R and at the mean value when quoting maximum and minimum limits. Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of ISO4259:2006 shall be applied.

2 The fuel may contain oxidation inhibitors and metal deactivators normally used to stabilize refinery petrol streams, but detergent/dispersive additives and solvent oils shall not be added.

3 The actual sulphur content of the fuel used for the type I test shall be reported.

4 Ethanol meeting the specification of prEN15376 is the only oxygenate that shall be intentionally added to the reference fuel.

5 There shall be no intentional addition to this reference fuel of compounds containing phosphorus, iron, manganese or lead.

BS VI Reference Fuel (E85)

Parameter	Unit	Limits[1]		Test method [2]
		Minimum	Maximum	
Research octane number, RON		95.0	–	EN ISO 5164
Motor octane number, MON		85.0		EN ISO 5163
Density at 15°C	kg/m^3	Report		ISO 3675
Vapour pressure	kPa	40.0	60.0	EN ISO 13016-1 (DVPE)
Sulphur content [3,4]	mg/kg	–	10.0	EN ISO 20846 EN ISO 20884
Oxidation stability	minutes	360		EN ISO 7536
Existent gum content (solvent washed)	mg / (100ml)	–	5	EN-ISO 6246
Appearance This shall be determined at ambient temperature or 15°C whichever is higher		Clear and bright, visibly free of suspended or precipitated contaminants		Visual inspection
Ethanol and higher alcohols[7]	% V/V	83	85	EN 1601 EN 13132 EN 14517
Higher alcohols (C3-C8)	% V/V		2.0	
Methanol	% V/V		0.5	
Petrol [5]	% V/V	Balance		EN 228
Phosphorus	mg/1		0.3[6]	ASTM D 3231
Water content	% V/V		0.3	ASTM D 1064
Inorganic chloride content	mg/1		1	ISO 6227
pHe		6.5	9.0	ASTM D 6423
Copper strip corrosion (3h at 50°C)	Rating	Class 1		EN ISO 2160
Acidity (as acetic acid CH_3COOH)	%m/m mg/1		0.005 (40)	ASTM D 1613
Carbon/hydrogen ratio		Report		
Carbon/oxygen ratio		Report		

1. The values quoted in the specifications are "true values". In establishment of limit values the terms of ISO 4259 Petroleum products-Determination and application of precision data in relation to methods of test have been applied and in fixing a minimum value, a minimum difference of 2R above zero has been taken into account; in fixing a Maximum and minimum value, the minimum difference is 4R (R=reproducibility). Notwithstanding this measure, which is necessary for technical reasons, the manufacturer of fuels shall nevertheless aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of ISO 4259 shall be applied.
2. In case of dispute, the procedure for dissolving the dispute and interpretations of the results based on test method precision, describe in EN ISO 4259 shall be used.
3. In case of national dispute concerning sulphur content, either EN ISO 20846 or EN IS) 20884 shall be called up similar to the reference in the National annex of EN 228.
4. The actual sulphur content of the fuel used for the Type I Test shall be reported.
5. The unleaded petrol content can be determined as 100-minus the sum of the per cent content of water and alcohol.
6. There shall be no intentional addition of compounds containing phosphorus, iron, manganese, or lead to this reference fuel.
7. Ethanol to meet the specification of EN 15376 is the only oxygenate that shall be intentionally added to this reference fuel.

BS VI ReferenceFuel (ED95)[1]

Parameter	Unit	Limits[2] Minimum	Maximum	Test method[3]
Total alcohol (Ethanol including content on higher saturated alcohols)	% m/m	92.4		EN 15721
Other higher saturated mono-alcohols (C3-C5)	% m/m		2.0	EN 15721
Methanol	% m/m		0.3	EN 15721
Density 15°C	kg/m3	793.0	815.0	EN ISO 12185
Acidity, calculated as acetic acid	% m/m		0.0025	EN 15491
Appearance	Bright and clear			
Flashpoint	°C	10		EN 3679
Dry residue	mg/kg		15	EN 15691
Water content	% m/m		6.5	EN 15489[4] EN-ISO 12937 EN15692
Aldehydes calculated as acetaldehyde	% m/m		0.0050	ISO 1388-4
Esters calculated as ethylacetat	% m/m		0.1	ASTM D1617
Sulphur content	mg/kg		10.0	EN 15485 EN 15486
Sulphates	mg/kg		4.0	EN 15492
Particulate contamination			24	EN 12662
Phosphorus	mg/1		0.20	EN 15487
Inorganic chloride	mg/kg		1.0	EN 15484 or EN 15492
Copper	mg/kg		0.100	EN 15488
Electrical conductivity	µS/cm		2.50	DIN 51627-4 or prEN 15938

1 Additives are necessary to fulfil the ED95 fuel specification such as cetane improver as specified by the engine manufacturer, shall be added to the ethanol fuel, as long as no negative side effects are known. If these conditions are satisfied, the maximum allowed amount is 10% m/m.

2 Denaturants for ED95 fuel, if required, shall be approved by the vehicle manufacturer or shall be either Ethyl Tert Butyl Ether (ETBE); or Iso butanol; or Methyl Ethyl Ketone (MEK); or Tert butanol or Iso Propanol.
The values quoted in the specifications are "true values". In establishment of their limit values the terms of ISO 4259 Petroleum products - Determination and application of precision data in relation to methods of test have been applied and in fixing a minimum value, a minimum difference of 2R above zero has been taken into account; in fixing a maximum and minimum value, the minimum difference is 4R ® =reproducibility). Notwithstanding this measure, which is necessary for technical reasons, the manufacturer of fuels shall nevertheless aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of ISO 4259 shall be applied.

3 Equivalent EN/ISO methods will be adopted when issued for properties listed above.

4 Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of EN 15489 shall be applied".

BS VI Ethanol Fuel : E100 as per IS 15464:2004

Sr. No.	Characteristic	Requirement
1	Relative density at 15.6/15.6 OC, max	0.7961
2	Ethanol content percent by volume at (excluding denaturant)	99.5
3	Miscibility with water	Miscible
4	Alkalinity	Nil
5	Acidity (as CH3COOH) mg/l, max	30
6	Residue on evaporation percent by mass, Max	0.005
7	Aldehyde content (as CH3CHO) mg/l, max	60
8	Cooper mg/kg, max	0.1
9	Conductivity, µ S/m, max	300
10	Methyl alcohol, mg/litre, max	300
11	Appearance	Clear and bright

BS VI Hydrogen Fuel

Characteristics	Units	Limits		Test Method
		Minimum	Maximum	
Hydrogen Purity	% mole	98	100	ISO 14687-1
Total Hydrocarbon	µmol/mol	0	100	ISO 14687-1
Water[1]	µmol/mol	0	2	ISO 14687-1
Oxygen	µmol/mol	0	2	ISO 14687-1
Argon	µmol/mol	0	2	ISO 14687-1
Nitrogen	µmol/mol	0	2	ISO 14687-1
CO	µmol/mol	0	1	ISO 14687-1
Sulphur	µmol/mol	0	2	ISO 14687-1
Permanent Particulates[3]				ISO 14687-1

(1) Not to be condensed

(2) Combined water, oxygen, nitrogen, argon: 1.900 µmol/mol.

(3) The hydrogen shall not contain dust, sand, dirt, gums, oils or other substances in an amount sufficient to damage the fuelling station equipment of the vehicle (engine) being fuelled.

BS VI Diesel Fuel (B7)

Parameter	Unit	Limits1		Test method
		Minimum	Maximum	
Cetane Index		46.0		EN ISO 4264
Cetane number [2]		52.0	56.0	EN ISO 5165
Density at 15°C	kg/m3	833.0	837.0	EN ISO 12185
Distillation:				
- 50% point	°C	245.0	—	EN ISO 3405
- 95% point	°C	345.0	360.0	EN ISO 3405
- final boiling point	°C	—	370.0	EN ISO 3405
Flash point	°C	55	—	EN ISO 2719
Cloud point	°C	—	-10	EN 23015
Viscosity at 40°C	mm^2/s	2.30	3.30	EN ISO 3104
Polycyclic aromatic hydrocarbons	%m/m	2.0	4.0	EN I12916
Sulphur content	mg/kg	—	10.0	EN ISO 20846 EN ISO 20884
Copper corrosion 3hrs 50 °C		—	Class1	EN ISO 2160
Conradson carbon residue (10 % DR)	% m/m	—	0.20	EN ISO 10370
Ash content	% m/m	—	0.010	EN ISO 6245
Total contamination	mg/kg	—	24	EN 12662
Water content	mg/kg	—	200	EN ISO 12937
Acid number	mg KOH/g	—	0.10	EN ISO 6618
Lubricity (HFRR wear scan diameter at 60°C)	µm	—	400	EN ISO 12156
Oxidation stability@110 °C[3]	h	20.0		EN 15751
FEME [4]	%v/v	6.0	7.0	EN 14078

1 The values quoted in the specifications are 'true values'. In establishment of their limit values the terms of ISO 4259 Petroleum products – Determination and application of precision data in relation to methods of test have been applied and in fixing a minimum value, a minimum difference of 2R above zero has been taken into account; in fixing a maximum and minimum value, the minimum difference is 4R (R = reproducibility). Notwithstanding this measure, which is necessary for technical reasons, the manufacturer of fuels shall nevertheless aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of ISO 4259 shall be applied.

2 The range for cetane number is not in accordance with the requirements of a minimum range of 4R. However, in the case of a dispute between fuel supplier and fuel user, the terms of ISO 4259 may be used to resolve such disputes provided replicate measurements, of sufficient number to archive the necessary precision, are made in preference to single determinations.

3 Even though oxidation stability is controlled, it is likely that shelf life will be limited. Advice shall be sought from the supplier as to storage conditions and life.

4 FAME content to meet the specification of EN 14214.

BIO Diesel

Biogas (Biomethane) As Per IS 16087 : 2013

Sr No.	Characteristic	Requirement	Method of Test
1	CH_4 percent Min	90	S 15130 (Part 3)
2	Moisture ,mg/m^3 Max	16	IS 15641 (Part 2)
3	H_2S,mg/m^3 Max	30.3	ISO 6326-3
4	CO_2 +N_2+O_2,percent Max (v/v)	10	IS 15130 (Part 3)
5	CO_2 percent Max (v/v) (when intended for filling in cylinders)	4	IS 15130 (Part 3)
6	O2,Percent Max (v/v)	0.5	IS 15130 (Part 3)

Reference Diesel Fuel Specification for BHARAT STAGE (Non Road) BS IV & BS V

Parameter	Unit	Limit (1)		Test method
		Min	Max	
Cetane Index		46.0		EN-ISO 4264
Cetane number [2]		52.0	56.0	EN-ISO 5165
Density at 15°C	kg/m^3	833.0	837.0	EN-ISO 12185
Distillation:				
-50% point	°C	245.0	-	EN-ISO 3405
-95% point	°C	345.0	360.0	EN-ISO 3405
-final boiling point	°C	-	370.0	EN-ISO 3405
Flash point	°C	55	-	EN-ISO 2719
Cloud point	°C	-	-10	EN 23015
Viscosity at 40°C	mm^2/s	2.30	3.30	EN-ISO 3104
Polycyclic Aromatic Hydrocarbons	% m/m	2.0	4.0	EN 12916
Sulphur content	mg/kg	-	10.0	EN-ISO 20846 EN-ISO 20884
Copper corrosion 3hrs, 50°C		-	Class 1	EN-ISO 2160
Conradson carbon residue (10% DR)	% m/m	-	0.20	EN-ISO 10370
Ash content	% m/m	-	0.010	EN-ISO 6245
Total contamination	mg/kg	-	24	EN 12662
Water content	mg/kg	-	200	EN-ISO 12937
Acid number	mg KOH/g	-	0.10	EN-ISO 6618
Lubricity (HFRR wear scan diameter at 60°C)	µm	-	400	EN-ISO 12156
Oxygen stability at 110°C [3]	h	20.0		EN 15751
FAME [4]	%v/v	6.0	7.0	EN 14078

1 The values quoted in the specifications are 'true values'. In establishment of their limit values the terms of ISO 4259 Petroleum products – Determination and application of precision data in relation to methods of test have been applied and in fixing a minimum value, a minimum difference of 2R above zero has been taken into account; in fixing a maximum and minimum value, the minimum difference is 4R (R = reproducibility). Notwithstanding this measure, which is necessary for technical reasons, the manufacturer of fuels shall nevertheless aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify whether a fuel meets the requirements of the specifications, the terms of ISO 4259 shall be applied.

2 The range for cetane number is not in accordance with the requirements of a minimum range of 4R. However, in the case of a dispute between fuel supplier and fuel user, the terms of ISO 4259 may be used to resolve such disputes provided replicate measurements, of sufficient number to archive the necessary precision, are made in preference to single determinations.

3 Even though oxidation stability is controlled, it is likely that shelf life will be limited. Advice shall be sought from the supplier as to storage conditions and life.

4 FAME content to meet the specification of EN 14214.

BS - IV Petrol

Parameter	Unit	Limit (1)		Test method
		Min	Max	
Research Octane Number, RON		95.0	-	EN 25164
Motor Octane Number, MON		85.0	-	EN 25163
Density at 15 °C	kg/m^3	740.0	754.0	ISO 3675
Reid Vapour Pressure	kPa	56.0	60.0	Pr EN ISO 13016-1(DVPE)
Distillation:				
evaporated at 70 °C	% v/v	24.0	40.0	EN-ISO 3405
evaporated at 100 °C	% v/v	50.0	58.0	EN-ISO 3405
evaporated at 150 °C	% v/v	83.0	89.0	EN-ISO 3405
final boiling point	°C	190.0	210.0	EN-ISO 3405
Residue	% v/v	-	2.0	EN-ISO 3405
Hydrocarbon Analysis				
Olefins	% v/v	-	10.0	ASTM D 1319
Aromatics	% v/v	29.0	35.0	ASTM D 1319
Benzene	% v/v	-	1.0	ASTM D 1319
Saturates	% v/v	Report		EN 12177
Carbon/ Hydrogen ratio		Report		ASTM D1319
Induction Period [2]	minutes	480	-	EN ISO 7536
Oxygen content	% m/m	-	1.0	EN 1601
Existent gum	mg/ml	-	0.04	EN ISO 6246
Sulphur content[3]	mg/kg	-	10	ASTM D 5453
Copper corrosion		-	Class 1	EN ISO 2160
Lead content	mg/l	-	5	EN 237
Phosphorus content	mg/l	-	1.3	ASTM D 3231

1 The values quoted in the specifications are “true values”. In establishment of their limit values the terms of ISO4 259 “Petroleum products – Determination and application of precision data in relation to methods of test” have been applied and infixing a minimum value, a minimum difference of 2R above zero has been taken in to account; in fixing a maximum and minimum value, the minimum difference is 4R (R=reproducibility)

2 Not with standing this measure, which is necessary for technical reasons, the manufacturer of fuels should never the less aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify the questions as to whether a fuel meets the requirements of the specifications, the terms of ISO 4259 should be applied.

3 The range for cetane number is not in accordance with the requirements of a minimum range of 4R. However, in the case of a dispute between fuel supplier and fuel user, the terms of ISO 4259 may be used to resolve such disputes provided replicate measurements, of sufficient number to archive the necessary precision, are made in preference to single determinations.

4 The actual sulphur content of the fuel used for the Type I test shall be reported.

BS - IV Diesel

Parameter	Unit	Limit (1)		Test method
		Min	Max	
Cetane number [2]		52.0	54.0	EN-ISO 5165
Density at 15°C	kg/m^3	833	837	EN-ISO 3675
Distillation:				
-50% point	°C	245	-	EN-ISO 3405
-95% point	°C	345	350	EN-ISO 3405
-final boiling point	°C	-	370	EN-ISO 3405
Flash point	°C	55	-	EN 22719
CFPP	°C	-	-5	EN 116
Viscosity at 40°C	mm^2/s	2.3	3.3	EN-ISO 3104
Polycyclic Aromatic Hydrocarbons	% m/m	3.0	6.0	IP 391
Sulphur content [3]	mg/kg	-	10	ASTM D 5453
Copper corrosion		-	Class 1	EN ISO 2160
Conradson carbon residue (10% DR)	% m/m	-	0.2	EN-ISO 10370
Ash content	% m/m	-	0.01	EN-ISO 6245
Water content	% m/m	-	0.02	EN-ISO 12937
Neutralisation (strong acid) number	mg KOH/g	-	0.02	ASTM D 974
Oxidation stability [4]	mg/ml	-	0.025	EN-ISO 12205
Lubricity (HFRR wear scan diameter at 60°C)	µm	-	400	CEC F-06-A-96
FAME		PROHIBITED		

1 The values quoted in the specifications are “true values”. In establishment of their limit values the terms of ISO4 259 “Petroleum products – Determination and application of precision data in relation to methods of test” have been applied and infixing a minimum value, a minimum difference of 2R above zero has been taken in to account; in fixing a maximum and minimum value, the minimum difference is 4R (R=reproducibility)

2 Not with standing this measure, which is necessary for technical reasons, the manufacturer of fuels should never the less aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify the questions as to whether a fuel meets the requirements of the specifications, the terms of ISO 4259 should be applied.

3 The range for cetane number is not in accordance with the requirements of a minimum range of 4R. However, in the case of a dispute between fuel supplier and fuel user, the terms of ISO 4259 may be used to resolve such disputes provided replicate measurements, of sufficient number to archive the necessary precision, are made in preference to single determinations.

4 The actual sulphur content of the fuel used for the Type I test shall be reported.

5 Even though oxidation stability is controlled, it is likely that shelf life will be limited. Advice should be sought from the supplier as to storage conditions and life

BS IV - CNG

For Category M and Category N Vehicles not exceeding 3,500 Kgs GVW

Characteristic	Units	Basis	Limits		Test method
			Min	Max	
Reference fuel G_{20}					
Composition:					
Methane	% mole	100	99	100	ISO 6974
Balance (1)	% mole	-	-	1	ISO 6974
N_2	% mole				ISO 6974
Sulphur content	mg/m^3 (2)	-	-	10	ISO 6326- 5
Wobbe Index (net)	MJ/m^3 (3)	48.2	47.2	49.2	
Reference fuel G_{25}					
Composition:					
Methane	% mole	86	84	88	ISO 6974
Balance (1)	% mole	-	-	1	ISO 6974
N_2	% mole	14	12	16	ISO 6974
Sulphur content	mg/m^3 (2)	-	-	10	ISO 6326- 5
Wobbe Index (net)	MJ/m^3 (3)	39.4	38.2	40.6	

(1) Inerts(different from N_2) + C_2+ C_{2+}.
(2) Value to be determined at 293, 2 K (20°C) and 101.3 kPa.
(3) Value to be determined at 273,2 K (0°C) and 101.3 kPa.

For Vehicles above 3,500 Kgs GVW

Characteristic	Units	Basis	Limits		Test method
			Min	Max	
Reference fuel G_R					
Composition:					
Methane		87	84	89	
Ethane		13	11	15	
Balance (1)	% -mole	-	-	1	ISO 6974
Sulphur content	mg/m^3 (2)	-	-	10	ISO 6326-5
(1) Inerts (different from N2) + $C2_+$					
Reference fuel G_{23}					
Composition:					
Methane		92.5	91.5	93.5	
Balance (1)	% mole	-	-	1	ISO 6974
N_2		7.5	6.5	8.5	
Sulphur content	mg/m^3 (2)	-	-	10	ISO 6326-5
Reference fuel G_{25}					
Composition:					
Methane		86	84	89	
Balance (1)	% mole	-	-	1	ISO 6974
N_2		14	12	16	
Sulphur content	mg/m^3 (2)	-	-	10	ISO 6326-5

(1) Inerts (different from N2) + C2+ C2+.
(2) Value to be determined at standard conditions (293.2 K (20°C) and 101.3 kPa).

Note : Commercial CNG fuel shall be used for testing till availability of reference fuel

BS - IV LPG

For Category M and Category N Vehicles not exceeding 3,500 Kgs GVW

Parameter	Unit	Fuel A	Fuel B	Test method
Composition				ISO 7941
C_3-content	% vol.	30± 2	85±2	
C_4-content	% vol.	balance	balance	
<C_3, >C4	% vol.	max. 2	max. 2	
Olefins	% vol.	max. 12	max. 15	
Evaporation residue	mg/kg	max. 50	max. 50	ISO 13757
Water at 0 ° C		free	free	Visual inspection
Total sulphur content	mg/kg	max. 10	max. 10	EN 24260
Hydrogen sulphide		none	none	ISO 8819
Copper strip corrosion	Rating	Class 1	Class 1	ISO 6251 (1)
Odour		Characteristic	Characteristic	
Motor Octane Number		min. 89	min. 89	EN 589 Annex B

(1) This method may not accurately determine the presence of corrosive materials if the sample contains corrosion inhibitors or other chemicals which diminish the corrosivity of the sample to the copper strip. Therefore, the addition of such compounds for the sole purpose of biasing the test method is prohibited.

For Category M and Category N Vehicles above 3,500 Kgs GVW

Parameter	Unit	Fuel A	Fuel B	Test method
Composition				ISO 7941
C_3-content	% vol.	50± 2	85±2	
C_4-content	% vol.	balance	balance	
<C_3, >C4	% vol.	max. 2	max. 2	
Olefins	% vol.	max. 12	max. 14	
Evaporation residue	mg/kg	max. 50	max. 50	ISO 13757
Water at 0 ° C		free	free	Visual inspection
Total sulphur content	mg/kg	max. 10	max. 10	EN 24260
Hydrogen sulphide		none	none	ISO 8819
Copper strip corrosion	Rating	Class 1	Class 1	ISO 6251 (1)
Odour		Characteristic	Characteristic	
Motor Octane Number		min. 92.5	min. 92.5	EN 589 Annex B

(1) This method may not accurately determine the presence of corrosive materials if the sample contains corrosion inhibitors or other chemicals which diminish the corrosivity of the sample to the copper strip. Therefore, the addition of such compounds for the sole purpose of biasing the test method is prohibited.

BS-III Petrol

Parameter	Unit	Limits (1)		Test Method
		Minimum	Maximum	
Research Octane Number, RON		95	-	EN 25164
Motor Octane Number, MON		85	-	EN 25163
Density at 15 °C	kg/m^3	748	762	ISO 3675
Reid Vapour Pressure	kPa	56	60	EN 12
Distillation:				
- Initial Boiling Point	°C	24	40	EN-ISO 3405
- Evaporated at 100°C	% v/v	49	57	EN-ISO 3405
- Evaporated at 150°C	% v/v	81	87	EN-ISO 3405
- final boiling point	°C	190	215	EN-ISO 3405
Residue	% v/v	-	2	EN-ISO 3405
Hydrocarbon analysis:				
Olefins	% v/v	-	10	ASTM D 1319
Aromatics	% v/v	28	40	ASTM D 1319
Saturates	% v/v	Balance		ASTM D 1319
Benzene	% v/v	-	1	pr. EN 12177
Carbon/Hydrogen ratio		Report		
Oxidation Stability(2)	minutes	480	-	EN -ISO 7536
Oxygen content	% m/m	-	2.3	EN 1601
Existent gum	mg/ml	-	0.04	EN -ISO 6246
Sulphur content (3)	mg/kg	-	100	Pr-EN ISO /Dis 14596
Copper corrosion		-	class 1	EN -ISO 2160
Lead content	mg/l	-	5	EN 237
Phosphorus content	mg/l	-	1.3	ASTM D 3231

1 The values quoted in the specifications are “true values”. In establishment of their limit values the terms of ISO 4259 “Petroleum products–Determination and application of precision data in relation to methods of test” have been applied and infixing a minimum value, a minimum difference of 2R above zero has been taken in to account; in fixing a maximum and minimum value, the minimum difference is 4R (R=reproducibility).
Not withstanding this measure, which is necessary for technical reasons, the manufacturer of fuels should never the less aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify the questions as to whether a fuel meets the requirements of the specifications, the terms of ISO 4259 should be applied.

2 The fuel may contain oxidation inhibitors and metal deactivator normally used to stabilize refinery gasoline streams ,but detergent /dispersive additives and solvant oils must be added

3 The actual sulphur content of the fuel used for the Type I test shall be reported.

BS-III Diesel

Parameter	Unit	Limits(1)		Test Method
		Minimum	Maximum	
Cetane number (2)		52	54	EN - ISO 5165
Density at 15°C	kg/m^3	833	837	EN - ISO 3675
Distillation :				
-50% point	°C	245	-	EN - ISO 3405
-95% point	°C	345	350	EN - ISO 3405
-final boiling point	°C	-	370	EN - ISO 3405
Flash Point	°C	55	-	EN 22719
CFPP	°C	-	-5	EN 116
Viscosity at 40°C	mm^2/s	2.5	3.5	EN - ISO 3104
Polycyclic Aromatic Hydrocarbons	% m/m	3	6	IP 391
Sulphur content (3)	mg/kg	-	300	Pr. EN-ISO/DIS14596
Copper corrosion		-	1	EN - ISO 2160
Conradson carbon residue (10% DR)	% m/m	-	0.2	EN - ISO 10370
Ash content	% m/m	-	0.01	EN - ISO 6245
Water content	%m/m	-	0.05	EN - ISO 12937
Neutralisation (strong acid) number	mg KOH/g	-	0.02	ASTM D 974-95
Oxidation stability (4)	mg/ml	-	0.025	EN - ISO 12205
New and better method for poly-cyclicaromatics under development	%m/m	-	-	EN 12916

1 The values quoted in the specifications are “true values”. In establishment of their limit values the terms of ISO4 259 “Petroleum products – Determination and application of precision data in relation to methods of test” have been applied and infixing a minimum value, a minimum difference of 2R above zero has been taken in to account; in fixing a maximum and minimum value, the minimum difference is 4R (R=reproducibility)
Not with standing this measure, which is necessary for technical reasons, the manufacturer of fuels should never the less aim at a zero value where the stipulated maximum value is 2R and at the mean value in the case of quotations of maximum and minimum limits. Should it be necessary to clarify the questions as to whether a fuel meets the requirements of the specifications, the terms of ISO 4259 should be applied.

2 The range for cetane number is not in accordance with the requirements of a minimum range of 4R. However, in the case of a dispute between fuel supplier and fuel user, the terms of ISO 4259 may be used to resolve such disputes provided replicate measurements, of sufficient number to archive the necessary precision, are made in preference to single determinations.

3 The actual sulphur content of the fuel used for the Type I test shall be reported.

4 Even though oxidation stability is controlled, it is likely that shelf life will be limited. Advice should be sought from the supplier as to storage conditions and life

BS - III CNG

Characteristics	Units	Basis	Limits		Test method
			Min	Max.	
Reference fuel G 20					
Composition:					
Methane	% mole	100	99	100	ISO 6974
Balance [Inerts (different from N2) + C2 +C2+]	% mole	-	-	1	ISO 6974
N_2	% mole	-	-	-	ISO 6974
Sulphur content	mg/m 3 (1)	-	-	50	ISO 6326-5
Reference fuel G 23					
Composition:					
Methane	% mole	92.5	91.5	93.5	ISO 6974
Balance [Inerts (different from N2) + C2 +C2+]	% mole	-	-	1	ISO 6974
N_2	% mole	7.5	6.5	8.5	ISO 6974
Sulphur content	mg/m 3 (1)	-	-	50	ISO 6326-5
Reference fuel G 25					
Composition:					
Methane	% mole	86	84	88	ISO 6974
Balance [Inerts (different from N2) + C2 +C2+]	% mole	-	-	1	ISO 6974
N_2	% mole	14	12	16	ISO 6974
Sulphur content	mg/m 3 (1)	-	-	50	ISO 6326-5

(1) Value to be determined at 293.2 K (20 °C) and 101.3 kPa

BS - III LPG

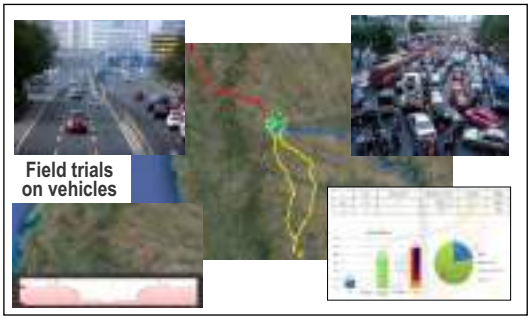
Parameter	Unit	Fuel A		Fuel B		Test method
		Min	Max	Min	Max	
Motor Octane Number		93.5		93.5		EN 589 Annx B
Composition :						
C3-content	% vol	48	52	83	87	ISO 7941
C4-content	% vol	48	52	13	17	ISO 7941
Olefins	% vol	0	12	9	15	ISO 7941
Evaporation residue	mg/kg		50		50	NFM 41-015
Total sulphur content	pmm weight (1)	-	50		50	EN 24260
Hydrogen sulphide	-		None		None	ISO 8819
Copper strip corrosion	Rating		class 1		Class1	ISO 6251 (2)
Water at 0 °C			Free		Free	Visual inspection

(1) Value to be determined at standard conditions 293.2K (20°C) and 101.3kPa

(2) This method may not accurately determine the presence of corrosive materials if the sample contains corrosion inhibitors or other chemicals which diminish the corrosivity of the sample to the copper strip. Therefore, the addition of such compounds for the sole purpose of biasing the test method is prohibited

Note : Commercial CNG / LPG fuel shall be used for testing till availability of reference fuel

Material Compatibility and Emission Performance Measurement with Alternate Fuels



Laboratory Evaluation through Immersion Study





Engine system component evaluation for wear rating

Fuel Consumption Calculation

The fuel consumption FC expressed in km per liter (in case of petrol, LPG & diesel) or in km/m3 (in case CNG) are calculated by carbon balance method using measured emissions of carbon dioxide (CO_2) and other carbon related emissions (hydrocarbons HC, carbon monoxide CO) in g/km.

i) For vehicles with a positive ignition engine fuelled with petrol:
$FC= 100 * D /\{(0.1154)*[(0.866*HC)+(0.429*CO)+ (0.273*CO_2)]\}$

ii) For vehicles with a positive ignition engine fuelled with LPG
$Fc_{norm}= 100 * (0.538) /\{(0.1212)*[(0.825*HC)+(0.429*CO)+ (0.273*CO_2)]\}$

If the composition of the fuel used for the test differs from the composition that is assumed for the calculation of the normalised consumption, on the manufacturer's request a correction factor cf may be applied, as follows:

$Fc_{norm}= 100 * (0.538) / \{(0.1212) \cdot (cf) \cdot [(0.825 \cdot HC) + (0.429 \cdot CO) + (0.273 \cdot CO_2)]\}$

The correction factor cf, which may be applied, is determined as follows:

$cf = 0.825 + 0.0693 \cdot n_{actual}$

where:
n_{actual} = the actual H/C ratio of the fuel used.

iii) For vehicles with a positive ignition engine fuelled with NG
$Fc_{norm}= 100 * (0.654) /\{(0.1336)*[(0.749*HC)+(0.429*CO)+ (0.273*CO_2)]\}$

iv) For vehicles with a compression ignition engine
$FC= 100 * D /\{(0.1155)*[(0.866*HC)+(0.429*CO)+ (0.273*CO_2)]\}$

In these formulae:

D = the density of the test fuel.

For the purpose of these calculations, the fuel consumption shall be expressed in appropriate units and the following fuel characteristics shall be used,

(a) Density: measured on the test fuel according to ISO 3675 or an equivalent method. For petrol and diesel fuel density measured at 15° C will be used; for LPG and natural gas a reference density will be used, as follows:
0.538 kg/liter for LPG
0.654 kg/m3 for NG*/
*/ Mean value of G20 and G23 reference fuels at 15°C.

(b) Hydrogen - carbon ratio: fixed values will be used which are:
1.85 for petrol
1.86 for diesel fuel
2.525 for LPG
4.00 for NG

For Vehicles with PI Engines

With Petrol E(5)Fuel:FC = (0.118/D)x[(0.848xHC)+(0.429xCO)+(0.273xCO_2)]

With Petrol E (10) Fuel :FC = (0.120/D)x[(0.830xHC)+(0.429xCO)+(0.273xCO_2)]

With Ethanol E(85) Fuel :FC = (0.120/D)x[(0.830xHC)+(0.429xCO)+(0.273xCO_2)]

H_2CNG Fuel: $FC = \left\{ \frac{(910.4 \times A + 13.600)}{(44.655 \times A^2 + 667.08 \times A)} \right\} X \left\{ \frac{(7.848 \times A)}{(9.104 \times A + 136)} \times HC + 0.429 \times CO + 0.273 \times CO_2 \right\}$

For Vehicles with CI Engines

With Diesel (B5) Fuel: FC = (0.116/D) X [(0.861xHC)+(0.429xCO)+(0.273xCO_2)]

With Diesel (B7) Fuel: FC = (0.116/D) X [(0.859xHC)+(0.429xCO)+(0.273xCO_2)]

For Vehicle Fuelled by gaseous hydrogen

$$FC = 0.024 \frac{V}{d} \left[\frac{1}{Z_1} \frac{P_1}{T_1} - \frac{1}{Z_2} \frac{P_2}{T_2} \right]$$

HC = the measured emission of hydrocarbons in g/km
CO= the measured carbon monoxide in g/km
Co_2 = the measured carbon dioxide in g/km
H_2O = the measured emission of H_2O in g/km
H_2 = the measured emission of H_2 in g/km
A = Quantity of NG/biomthane within the H2CNG mixture,in %V

D = Density of Test fuel .In case of gaseous fuels this is density at 15 °C
d = theoretical distance covered by vehicle tested under the Type I test in km
p_1= Pressure in gaseous fuel tank before operating cycle in Pa
p_2 = Pressure in gaseous fuel tank after operating cycle in Pa
T_1 = Temperature in gaseous fuel tank before the operating cycle in K
T_2 = Temperature in gaseous fuel tank after the operating cycle in K
Z_1 = Compressibility factor of the gaseous fuel at p_1 & T_1
Z_2 = Compressibility factor of the gaseous fuel at p_2 & T_2
V = Inner volume of the gaseous fuel tank in m^3

Note: The fuel consumption ,expressed in litres per 100 km (in case of petrol (E5/E10),LPG,ethanol (E 85),and diesel (B5/B7) in m^3 per 100km (in the case of NG/biomethane and H2NG) or in Kg per 100 km(in case of hydrogen) is calculated by these formulae.

Compressibility Factor

		T (K)									
		5	100	200	300	400	500	600	700	800	900
p(bar)	33	0.859	1.051	1.885	2.648	3.365	4.051	4.712	5.352	5.973	6.576
	53	0.965	0.922	1.416	1.891	2.338	2.765	3.174	3.57	3.954	4.329
	73	0.989	0.991	1.278	1.604	1.923	2.229	2.525	2.81	3.088	3.358
	93	0.997	1.042	1.233	1.47	1.711	1.947	2.177	2.4	2.617	2.829
	113	1	1.066	1.213	1.395	1.586	1.776	1.963	2.146	2.324	2.498
	133	1.002	1.076	1.199	1.347	1.504	1.662	1.819	1.973	2.124	2.271
	153	1.003	1.079	1.187	1.312	1.445	1.58	1.715	1.848	1.979	2.107
	173	1.003	1.079	1.176	1.285	1.401	1.518	1.636	1.753	1.868	1.981
	193	1.003	1.077	1.165	1.263	1.365	1.469	1.574	1.678	1.781	1.882
	213	1.003	1.071	1.147	1.228	1.311	1.396	1.482	1.567	1.652	1.735
	233	1.004	1.071	1.148	1.228	1.312	1.397	1.482	1.568	1.652	1.736
	248	1.003	1.069	1.141	1.217	1.296	1.375	1.455	1.535	1.614	1.693
	263	1.003	1.066	1.136	1.207	1.281	1.356	1.431	1.506	1.581	1.655
	278	1.003	1.064	1.13	1.198	1.268	1.339	1.409	1.48	1.551	1.621
	293	1.003	1.062	1.125	1.19	1.256	1.323	1.39	1.457	1.524	1.59
	308	1.003	1.06	1.12	1.182	1.245	1.308	1.372	1.436	1.499	1.562
	323	1.003	1.057	1.116	1.175	1.235	1.295	1.356	1.417	1.477	1.537
	338	1.003	1.055	1.111	1.168	1.225	1.283	1.341	1.399	1.457	1.514
	353	1.003	1.054	1.107	1.162	1.217	1.272	1.327	1.383	1.438	1.493

In the case that the needed input values for p and T are not indicated in the table , the compressibility factor shall be obtained by linear interpolation between the compressibility factors indicated in the table , choosing the once that are closest to the sought value

Fuel Consumption Standards for M1 Vehicles with GVW<3.5 ton as per S.O 1072(E)

Each Manufacturer of motor vehicle shall comply with energy consumption standard in terms of average fuel consumption standards

Average fuel consumption standard = a x (w-b) + c

a = constant multiplier

Average fuel consumption standard = Average fuel consumption standard of manufacturer in petrol equivalent liter per 100 kilimeter;

b = fixed constant;

c = fixed constant;

W = Weighted average of unladen mass in kilogram (kg) for all new said motor vehicle,manufactured or imported for sale by the manufacturer

Constant Multiplier and Fixed Constant Table

For fiscal years 2017-18 to 2021-22

a	0.0024
b	1037
c	5.4922
Average Fuel Consumption standard for manufacturer	= 0.0024 x (W-1037) + 5.4922

For fiscal year 2022-23 onwards

a	0.002
b	1145
c	4.7694
Average Fuel Consumption standard for manufacturer	= 0.002 x (W-1145) + 4.7694

Weighted average Unladen mass (W) = $W = \Sigma N_i W_i / \Sigma N_i$

N_i = Number of the said motor manufactured or imported for sale in India of a model I in the respective fiscal year;

W_i = Unladen mass in kilogram of a model i in the respective fiscal year

Average of Actual Fuel Consumption = $W = \Sigma K_i N_i FC_i / \Sigma N_i$

Where

N_i = Number of vehicles manufactured or imported for sale of a model i

FC_i = Petrol equivalent fuel consumption in liter per 100 kilometer of a model i

K_i = Equivalent vehicle credits for electric vehicles;

(a)The actual fuel consumption of every model in terms of the liter per 100 kilometer)in case of petrol, LPG or diesel) and in kilogram per one hundred kilometer in case of CNG shall be calculated by following formulae:

FC petrol	= 0.04217 X CO_2
FC diesel	= 0.03776 X CO_2
FC LPG	= 0.06150 X CO_2
FC CNG	= 0.03647 X CO_2

CO_2 = the measured emission of carbon dioxide in gram per kilometer as per type approval ;

(b) The Actual fuel consumption of every electrically driven model shall be measured in terms of kwh per one hundred kilometer as per type approval

(c) The actual fuel consumption in petrol equivalent for diesel ,LPG,CNG and electricity driven motor vehicles shall be obtained by multiplying the actual fuel consumption referred to in (a) and (b) above with correction factors specified below

Fuel Type	Conversion Factor to Petrol equivalent
Diesel	1.1168
LPG	0.6857
CNG	1.1563
Electricity	0.1028

Transmission & Gearbox Test Center (TGTC) at HTC



Transmission & Gearbox Test Centre at ARAI-Homologation & Technology Centre, Chakan is a state-of-the-art transmission development lab in the country, engaged in research, development & evaluation of all types of transmission systems, such as Manual, Automatic, Continuously Variable (CVT), Automated Manual (AMT), Dual Clutch, and Hybrid Driveline for vehicles ranging from three wheelers, passenger cars, light & heavy commercial vehicles, tractors and earth movers.

1201

International Maritime Organization(IMO) Regulation
Emission Norms applicable for Indian Vessels plying to International Waters

NOx Implementation Scheme

Ship Constructed (≥1 January)	Application of Standard	Emission Limits	Compliance at engine's delivery except as below
1990 to 2000 Retroactive to existing engines	Engine size > 5000kW and ≥ 90 liters per cylinder displ.	Tire I	1st IAPP Renewal Survey ≥ 12 mo after IMO advised by party of availability (physical & cost) of "upgrade kit"
2000 ≤ X < 2011	> 130kW		-----
2011 ≤ X < 2016		Tire II	
≥ 2016	Ship ≥ 24m L or total propulsion power ≥ 750 kW		Operation outside of ECA
		Tire III	Operation within ECA

NOx Emission Standards

RPM	Total weight of NO2 Emission (g/kWh)			Relative No2 Reduction from Tire I
	<130	130≤n<2000	≥2000	
Tire I	17	$45*n^{(-0.2)}$	9.8	Current
Tire II	14.4	$44*2^{(-0.23)}$	7.7	15.5% - 12.8%
Tire III	3.4	$9*n^{(-0.2)}$	2	80%

AdBlue specification data sheet

	Unit	Min. Limit	Max. Limit
DIN 70070 ISO 22241			
Urea concetration	% by weight	31.8	33, 2
Density at 20 °C	kg/cm³	1087	1093
Refractive index at 20°C		13814	13, 843
Alkalinity	% by weight	-	0,2
Carbonate	% by weight	-	0,2
Biuret	% by weight	-	0,3
Aldehyde	mg/kg	-	5
Insoluble	mg/kg	-	20
Phosphate	mg/kg	-	0,5
Calcium	mg/kg	-	0,5
Iron	mg/kg	-	0,5
Copper	mg/kg	-	0,2
Zinc	mg/kg	-	0,2
Chromium	mg/kg	-	0,2
Nickel	mg/kg	-	0,2
Aluminium	mg/kg	-	0,5
Magnesium	mg/kg	-	0,5
Sodium	mg/kg	-	0,5
Potassium	mg/kg	-	0,5

National Ambient Air Quality Standard (CPCB)

Rev on 16th Nov 2009 as per GSR 826 (E)

Sr. No.	Pollutants	Time Weighted Average	Concentration in Ambient Air		Method of Measurement
			Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Govt.)	
1	Sulphur Dioxide (SO2), µg/m^3	Annual *	50	20	Improved West and Gaeke Method
		24 hours**	80	80	Ultraviolet Fluorescence
2	Nitrogen Dioxide (NO2), µg/m^3	Annual *	40	30	Modified Jacob & Hochheiser Modified
		24 hours**	80	80	(Na-Arsenite) Method / Chemiluminescence
3	Particulate Matter (size less than 10 µm) or PM 10, µg/m^3	Annual *	60	60	Gravimetric / TEOM / Beta Attenuation
		24 hours**	100	100	
4	Particulate Matter(size less than 2.5 µm) or PM2.5, µg/m^3	Annual *	40	40	Gravimetric / TEOM / Beta Attenuation
		24 hours**	60	60	
5	Ozone (O3), µg/m^3	8 hours**	100	100	UV Photometric technology
		1 hour*	180	180	Chemiluminescence / Chemical Method
6	Lead (Pb), µg/m^3	Annual*	0.5	0.5	AAS /ICP Method after sampling using EPM 2000 or equivalent
		24 hours**	1	1	ED XRF using Teflon Filter
7	Carbon Monoxide (CO), mg/m^3	8 hours**	2	2	Non Dispersive Infra Red (NDIR) Spectroscopy
		1 hour*	4	4	
8	Ammonia (NH3) , µg/m^3	Annual *	100	100	Chemiluminescence
		24 hours**	400	400	Indophenol- blue method
9	Benzene(C6H6), µg/m^3	Annual *	5	5	Gas Chromatography based continuous analyzer/ Adsorption & desorption followed by GC analysis
10	Benzo a Pyrene (BaP) (particulate phase only), ng/m^3	Annual *	1	1	Solvent extraction followed by HPLC/GC analysis
11	Arsenic, ng/m^3	Annual *	6	6	AAS /ICP Method after sampling on EPM 2000 or equivalent filter paper
12	Nickel, ng/m^3	Annual *	20	20	

continued..

* Annual Arithmatic Mean of minimum 104 measurments in a year at a particular site taken twice in a week 24 hrly at uniform intervals
** 24 hourly or 08 hourly or 01 hourly monitored values as applicable shall be complied with 98% of the time, they may exceed the limits but not on two consecutive days of monitoring

Note : Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be consider adequate reason to institute regular or continuous monitoring and further investigation

Ambient Air Quality Standards in respect of Noise (CPCB)
Under the Noise Pollution (Regulation and Control) Rules, 2000

The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.)

Area Code	Category of Area / Zone	Limits in dB (A) Leq*	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Zone	50	40

Note :

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
2. Night time shall mean from 10.00 p.m. to 6.00 a.m.
3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A “decibel” is a unit in which noise is measured.

“A”, in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is an energy mean of the noise level over a specified period.

Global Warming Potential of Green House Gases (GHGs)

Green House Gases	Formula	Pre-industrial conc.	1995 conc.	Global Warming Potential (Over Time Horizon of 100 years)
Carbon Dioxide	CO2	278 ppm	360 ppm	1
Methane	CH4	700 ppb	1721 ppb	23
Nitrous Oxide	N2O	275 ppb	315 ppb	296
Dichlorodifluoro Methane (CFC-12)	CCI2F2	0	0.5 ppb	6200 - 7100
Chlorodifluoro Methane (HCFC-22)	CHCIF2	0	0.1 ppb	1300 - 1400
Perfluoro Methane	CF4	0	0.07 ppb	6500
Sulfur hexa fluoride	SF6	0	0.03 ppb	23900

Lead (Pb), µg/m^3	• Absorbed into blood; similar to calcium • Accumulates in blood, bones, muscles, fat • Damages organs – kidneys, liver, brain, reproductive system, bones (osteoporosis) • Brain and nervous system – seizures, mental retardation, behavioral disorders, memory problems, mood changes, • Young children - lower IQ, learning disabilities • Heart and blood – high blood pressure and increased heart disease
Carbon Monoxide (CO) mg/m^3	• Reacts with hemoglobin in blood • Forms carboxyhemoglobin (HbCO) rather than oxyhemoglobin (HbO2) • Prevents oxygen transfer • Low-level: cardiovascular and neurobehavior • High-level: headaches/nausea/fatigue to possible death • Oxygen deficient people esp. vulnerable (anemia, chronic heart or lung disease, high altitude residents, smokers) • Cigarette smoke: 400-450 ppm; • smoker's blood 5-10% HbCO vs 2% for non-smoker
Ammonia (NH3) , µg/m^3	• Causes immediate burning of the eyes, nose, throat and respiratory tract and can result in blindness, lung damage or death • Inhalation of lower concentrations can cause coughing, and nose and throat irritation.
Benzene(C6H6), µg/m^3	Short Term Exposure Headaches, vomiting, disorientation, shakiness, elevated heart rate, and loss of consciousness Long Term Exposure Exposed to it over a long period of time are at the highest risk for developing benzene-related illnesses, which range from anemia to cancer like Leukemia.

Benzo a Pyrene (BaP) (particulate phase only), ng/m^3	Short-term health effects • Skin rash or eye irritation with redness and/or a burning sensation. • Exposure to sunlight and the chemical together can increase these effects. Long-term health effects • probable cancer-causing agent in humans • it causes skin, lung, and bladder cancer in humans and in animals
Arsenic, ng/m^3	Exposure to inorganic arsenic can cause various health effects, viz., • irritation of the stomach and intestines, • decreased production of red and white blood cells, • skin changes and lung irritation • damage DNA Uptake of significant amounts of inorganic arsenic can intensify the • chances of cancer development especially development of skin cancer, lung cancer, liver cancer and lymphatic cancer • high exposure to inorganic arsenic can cause infertility and miscarriages with women, • skin disturbances, declined resistance to infections, • heart disruptions and brain damage with both men and women • inorganic arsenic can poisoning of livestock near various industrial processes can penetrate into human body after their consumption.
Nickel, ng/m^3	An uptake of too large quantities of nickel has the following consequences: - Higher chances of development of lung cancer, nose cancer, larynx cancer and prostate cancer - Sickness and dizziness after exposure to nickel gas - Lung embolism and Respiratory failure - Birth defects - Asthma and chronic bronchitis - Allergic reactions such as skin rashes, mainly from jewellery - Heart disorders

Details of Health Effects of Various Air Pollutants

Sulphur Dioxide (SO2), µg/m^3	Short-term intermittent exposures • Bronchoconstriction (temporary breathing difficulty) • E/N/T irritation • Mucus secretion Long-term exposures • Respiratory illness • Aggravates existing heart disease • Intensified in presence of PM
Nitrogen Dioxide (NO2), µg/m^3	Long Term exposure • Pulmonary fibrosis, emphysema, and higher LRI (lower respiratory tract illness) in children • Toxic acute effects at 10-30 ppm • Nose and eye irritation • Lung tissue damage and Pulmonary edema (swelling) • Bronchitis /Effect on Defense mechanisms • Pneumonia / Aggravate existing heart disease
Particulate Matter (size less than 10 µm) or PM 10 µg/m^3	Short-term exposure effects • Lung inflammatory reactions • Respiratory symptoms • Adverse effects on the cardiovascular system • Increase in medication usage and hospital admissions • Increase in mortality
Particulate Matter (size less than 2.5 µm) or PM2.5, µg/m^3	Long-term exposure effects • Increase in lower respiratory symptoms • Reduction in lung function in children • Increase in chronic obstructive pulmonary disease • Reduction in lung function in adults • Reduction in life expectancy, owing mainly to cardiopulmonary mortality and probably to lung cancer
Ozone (O3), µg/m^3	Acute Health effects • Severe E/N/T (ear/nose/throat) irritation • Eye irritation at 100 ppb • Interferes with lung functions • Coughing at 2 ppm Chronic Health Effects • Irreversible, accelerated lung damage

1206



EMISSION LABORATORY

- **Type Approval (TA), Conformity of production (COP) and Development evaluation for**
  - **2/3 wheelers, Passenger Cars, Light Commercial Vehicles**
  - **Heavy Commercial Vehicle (HCV) engines, Tractor, Construction equipment, Stationary and Gen- set engines**
- **Nano particle measurement facility**
- **Evaporative emission measurement in SHED facility**
- **State-of-art utilities for temperature & humidity control in all test areas, central gas handling system, eco friendly fire fighting system and emergency power back-up**
- **Accredited & Certified -**
  NABL - ISO / IEC 17025; 2005 , ISO 9001:2008, ISO 14001: 2004 & OHSAS 18001:2007

Our Capabilities and Competence

- Emission System / Laboratory / Facility approval at Vehicle / Engine Manufacturers place for COP tests.
- Certification as per EPA, CARB , European and Japanese Standards.
- Evaluation of alternate fuel vehicles / engines - CNG, LPG, Hydrogen, Ethanol, Methanol, Bio-diesel.
- Development assignments to optimize engines, assessment of after treatment devices (cat. con., particulate trap) and pollution control devices (Secondary air injection, EGR, FIPs) for performance & durability.
- Development assignments to evaluate Buses and Trucks for pollution control devices for emissions, fuel efficiency etc.
- Special assignments on evaluation of oil / fuel / additive for performance, emission and fuel consumption
- Study of Particulate matters for toxicity and evaluation of Nano-particles
- Ambient air quality Management:- Air Quality Monitoring, Emission factor determination & source profile, Inventory generation (line/area/point sources), forecasting studies and health impact assessment.
- Formulation of Regulations / Procedures on Emission and related issues
- Knowledge sharing through workshop / seminar and special training courses on emission / alternate fuels
- Secretariat for standing Commitee on implementation of Emission Legislation.
- Secretariat for working party on pollution and energy (GRPE) under WP 29

1207







TWO WHEELER EMISSION TEST FACILITY

- Compliance to BSII, BSIII, BSIV, BSVI,European, EPA Norms
- Equipped with Chassis dynamometer ,CVS system, Emission analyzer bench, Weather station
- To ensure accuracy of measurement, fully automated test bench with controlled ambient air parameter like humidity and temperature.
- Chassis Dyno capacity: Power : 70 KW, Inertia Range :100-550kg, Max Speed : 200 Kmph

TWO / THREE WHEELER EMISSION TEST FACILITY

- Compliance to BSII, BSIII, BSIV, BSVI, European Norms
- Equipped with Chassis dynamometer, CVS system with Dilution tunnel, Emission analyzer bench, Weather station, 2.5 µm PM measurement system.
- To ensure accuracy of measurement, fully automated test bench with controlled ambient air parameter like humidity and temperature
- Chassis Dyno capacity :- Power : 50 kW, Inertia range : 100 to1500 kg, Max Speed : 200kmph

FOUR WHEELER EMISSION TEST FACILITY

- Compliance to BS III, BS IV, BS VI, Euro IV, Euro V, EPA and future norm
- Equipped with Universal chassis dynamometer, CVS system with dilution tunnel and latest generation exhaust gas analyzer bench with dirty /clean line concept for distinguishing between clean & dirty vehicles during emission measurement
- To ensure accuracy of measurement, fully automated test bench with controlled ambient air parameter like humidity and temperature.
- Chassis Dyno capacity :- Power : 150 kW, Inertia range : 120 -5443 kg, Max Speed : 200kmph
- Impinger system for carbonyl emission measurement from ethanol/ methanol fueled vehicles



HCV EMISSION TEST FACILITY

- Unique facility for development tests for vehicle evaluation, mass emission, fuel consumption and performance evaluation of oil and lubricants on trucks and buses.
- It is equipped with Chassis dynamometer ,CVS system with PM measurement, Emission analyzer system & Weather control with temperature conditioning test cell.
- Chassis dyno capacity: - Power :150 kW, Inertia range Up to 32000 kg, Max. Speed : 100 kmph



SEALED HOUSING FOR EVAPORATIVE DETERMINATION (SHED)

- Compliance to Indian, European, EPA and CARB Regulations
- Capable of measuring evaporative emission from 2, 3 and 4 Wheeler vehicles
- The 87.48 m^3 volume SHED facility has wide temperature range of 15 °C - 50 °C
- Fully Automated facility.

1208

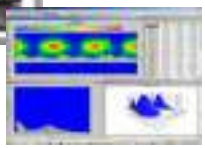




Engine Dynamometer Test Facilites

- Compliance to BS II, BS III ,BS IV ,BS VI, Euro IV, Euro V, Euro VI, EPA and future norms
- Evaluation of engine emission (Engine Steady State Cycle & Engine Transient cycle), power test, smoke test
- Steady state dynamometer facility is equipped with Engine dynamometer, Raw emission analyzer bench ,Partial flow PM sampling system, Dynamic fuel meter, Fuel and coolant conditioning unit, Smoke meter.
  - Steady state dynamometer capacity:-20 kW,150 kW
- Transient state dynamometer facility is equipped with Engine dynamometers, Full flow CVS & Dilution tunnel system ,Dilute emission analyzer bench. Dynamic Fuel meter, Fuel and coolant conditioning unit, Smoke meter, FTIR for NH_3 measurement, PN measurement system. High altitude simulation up to 5500 feet
  - Transient dynamometer capacity :- 220 kW, 500 kW, 250 kW
- To ensure accuracy of measurement, fully automated test benches with controlled engine intake air parameter like temperature, pressure and humidity





Engine Exhaust Particle Sizer (EEPS)



Condensation Particle Counter (CPC)



Rotating Disk Thermodiluters and Thermal Conditioner Air Supply

Nano Particle Evaluation Facility

- Facility is based on GRPE - PMP group recommendation, which includes dilution tunnel with PCF (Pre-classifier) to cut down exhaust particles below 2.5 µm, HEPA (High Efficiency Particulate Filter) to provide dilution air with filtering efficiency 99.99%, VPR (Volatile Particle remover) and CPC (Condensation Particle Counter).
- Fast Response Particle Sizer (FRPS) for online nano particle measurement in terms of number, surface area and size distribution pattern, which is useful for R&D work.
- Evaluation of nano particle emission for 2,3 and 4-wheeled vehicles, buses and heavy commercial vehicles operating on diesel, gasoline, alternate fuels like CNG / LPG.
- Well equipped Chemical Laboratory to carry out chemical speciation of nano particulate in terms of SOF and IOF analysis







Climatic Vehicle Test Cell (CVTC)

- Climatic Chamber & Low temperature soak room with temperature range from -30°C to 55 °C
- Emission Testing for Vehicle up to 3.5 T GVW
- Capability for Type-VI Regulatory Test - Measurement of Cold CO and HC at -7°C
- For Solar Simulation with Radiation area:7500 mm x 2500 mm
- Chassis Dynamometer with 220kW Power, Inertia Simulation from 454 to 5448 Kg and Max Speed 250 Km/h
- Data Acquisition and Complete Test Cell Automation
- Mileage Accumulation Chassis Dynamometer (MACD)
- Endurance Testing of 2WD and 4WD Vehicle
- Chassis Dyno with 220 kW Power, Inertia Simulation from 454 to 5448 Kg and Max Speed 250 Km/h
- Robot Driver for all Global Driving Cycles for Actuation of Gear ,Throttle,Clutch,Brake & Ignition key
- Automatic Refuelling system to handle liquid Fuels like Petrol,Diesel,Ethanol,Methanol & various blends and Gaseous fuels like LPG ,CNG and other alternate fuels
- Data Acquisition System with 33 Channels



Vehicle Test Cell (VTC 1)

- Domestic Certification for the current BS-III,BS-IV Emission Regulations and forthcoming BS-V ,BS-VI Regulations
- Export Homologation Testing as per UNECE, EEC Directives and US EPA and Japanese Emission Regulation
- Emission Testing on Vehicles fueled with Liquid fuels such as Diesel, Petrol, Methanol,and their blends and Gaseous fuel such as LPG, CNG and it blends with Hydrogen
- Chassis Dyno with 150 kW Power and Inertia Simulation up to 5448 Kg and Max. Speed 250 km/h
- Additional Dilution Tunnel for Gasoline Direct Injection Vehicles with PM and PN Measurement
- Test Cell Temperature : 25°C +/- 5°C ,Controllable within 25°C+/-1°C,Test Cell Humidity : 9 +/- g of H2O/Kg dry air, Soak Room Temperature: Controllable within 23 °C +/- 2°C
- PM Conditioning Chamber with Microbalance having readability of 0.1 Mg and
- Temperature and Humidity Control
- Opacimeter for Smoke Measurement ,Dynamic Fuel flow meter for measurement of continuous fuel flow
- Central gas handling system for operating and calibration gases



VV-VT SHED for Evaporative Determination

- Capacity to Test the Gasoline and Ethanol fuelled 3wh and 4wh vehicle as per Euro III and Euro VI Regulation
- Volume Compensation System: Movable roof with test volume range from 47 cu-m to 54.0 cu-m
- Temperature Range : 10°C to 60°C, Controllability : +/- 0.3°C
- SHED Chamber Size : 6500mm(L) x 2600mm(W) x 2500mm(H)
- Independent, Sequential and Multiple Canister Loading Bench with Auxiliary Canister and scale for Breakthrough Test, having feature for Certification and Development purpose
- Onboard Refueling Vapor Recovery (ORVR) Test facility
- Fuel Cart with adjustable Fuel Conditioning
- Temperature Range : 10°C to 32°C
- Adjustable flow rate : 3-12 Gallons per minute

Glossary

BS	Bharat Stage
CC	Cubic Capacity
CEV	Construction Equipment Vehicle
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO_2	Carbon Dioxides
ESC	Engine Steady state Cycle
ETC	Engine Transient Cycle
FC	Fuel Consumption
GVW	Gross Vehicle Weight
HC	Hydrocarbon
IDC	Indian Driving Cycle
LPG	Liquefied Petroleum Gas
M category	A Motor vehicle with at least four wheels used for carrying passengers
M1 category	A vehicle used for carriage of passengers, comprising not more than eight seats in addition to the driver's seat
M2 category	A vehicle used for carriage of passengers, comprising nine or more seats in addition to the driver's seat, and having a maximum Gross Vehicle Weight (GVW) not exceeding 5 ton
MIDC	Modified Indian Driving Cycle
M3 category	A vehicle used for the carriage of passengers, comprising nine or more seats in addition to the driver's seat and having a GVW exceeding 5 ton.
N category	A Motor vehicle with at least four wheels used for carrying goods
N1 category Vehicles	Vehicle used for the carriage of goods and having a GVW not exceeding 3.5 ton
N2 category	Vehicle used for the carriage of goods and having a GVW exceeding 3.5 tons but not exceeding 12 ton
N3 category	Vehicle used for the carriage of goods and having a GVW exceeding12 ton.
NMHC	Non - Methane Hydrocarbon
NOx	Nitrogen Oxides
OBD	On-Board Diagnostic
PM	Particulate Matter
RHC	Relative Hydrocarbon
SHED	Sealed Housing Evaporative Determination

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1211

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On Behalf of :
Automotive Industry Standard Committee (AISC)



1211-A

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI
APPEAL NO. 17 OF 2021

IN THE MATTER OF:

UNIVERSITY OF DELHI ... APPELLANT

VERSUS

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE & ORS ... RESPONDENTS

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FILED BY

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PLACE: NEW DELHI
DATE :27.09.2021

ANNEXURE-R17

Annexure III

Air pollution management in the context of Graded Action Plan for Delhi & NCR

As per MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFICATION New Delhi, (G.S.R. 94) dated 25th January, 2018

Mandatory Implementation of Dust Mitigation Measures for Construction and Demolition Activities for projects requiring Environmental Clearance:

i) This Building project shall be implemented only after obtaining environmental clearance with approved Environmental Management Plan inclusive of dust mitigation measures
ii) Roads leading to or at construction sites is paved and blacktopped (i.e. metallic roads).
iii) No loose soil or sand or Construction & Demolition Waste or any other construction material that causes dust shall be left uncovered.
iv) Wind-breaker having height of 11 meters has been provided.
v) Water sprinkling system shall be put in place before start of construction activities.
vi) Dust mitigation measures shall be displayed prominently at the construction site for easy public viewing.

Mandatory Implementation of Dust Mitigation Measures for all Construction and Demolition Activities:

i) Grinding and cutting of building materials in open area shall be prohibited and will be done in enclosed spaces.
ii) Construction material and waste will be stored only within earmarked area and road side storage of construction material and waste shall be prohibited.
iii) Construction materials will be fully covered in vehicles while carrying construction materials to the project site. Cover of waste will be applied while transporting excavated earth and construction & demolition waste from the site to the C&D waste management facility.
iv) Existing Construction and Demolition Waste processing and disposal sites located nearby the project site is IL&FS Environmental Infrastructure & Services Limited, Gate no. 1, Hanuman Mandir Road, near MCD Colony, Jahangirpuri, Delhi – 110033 [Capacity 2000 TPD]

Central Pollution Control Board Ministry of Environment, Forest & Climate Change (Govt. of India)
Graded Response Action Plan for Delhi & NCR

Severe + or Emergency (ambient PM2.5or PM10concentration values of 300µg/m3 or 500 µg/m3 respectively persist for 48 hours or more)	**Agency responsible/ Implementing Agency**	**Response of Young Builders Pvt. Ltd.**
Stop entry of truck traffic into Delhi (except essential commodities)	Municipal Corporations and Traffic Police of Delhi and NCR Towns	Will be complied once directive issued by the competent authority
Stop construction activities	Delhi Pollution Control Committee/Municipal	Immediately stop all construction activities once

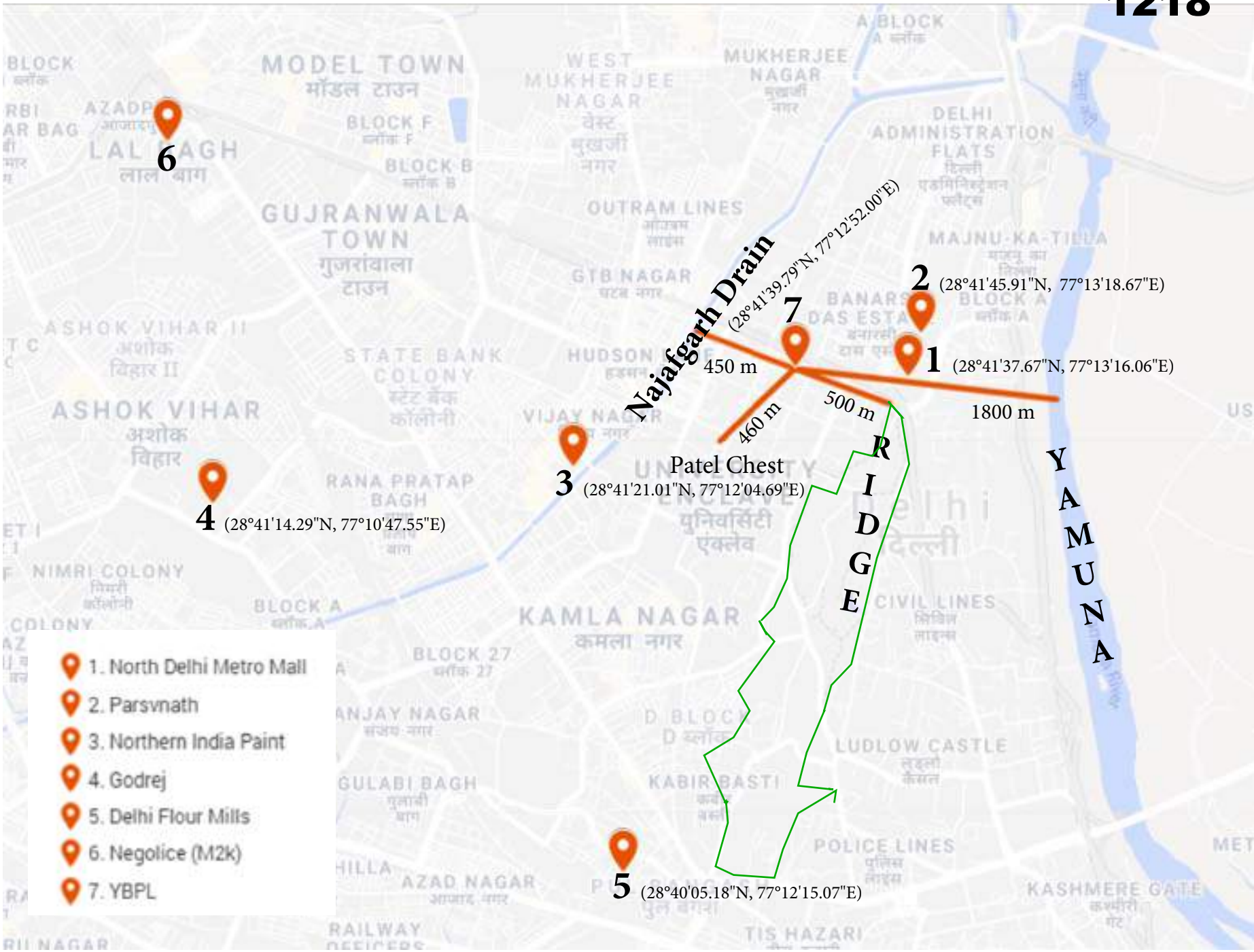
	Corporations of Delhi and NCR town	directive issued by the competent authority
Introduce odd and even scheme for private vehicles based on license plate numbers and minimize exemptions	Secretary cum Commissioner of Transport Department, NCT of Delhi, and Transport Commissioners of NCR towns	Will be complied once directive issued by the competent authority
Task Force to take decision on any additional steps including shutting of schools		Not applicable
Severe (ambient PM2.5or PM10concentration value is more than 250 µg/m3 or 430µg/m3 respectively)	**Agency responsible/ Implementing Agency**	**Response of Young Builders Pvt. Ltd.**
Close brick kilns, Hot Mix plants, Stone Crushers	Chairpersons Delhi Pollution Control Committee, State Pollution Control Boards of Haryana, Rajasthan, and Uttar Pradesh Superintendent of Police and Deputy Commissioner of respective districts	Not applicable
Shut down Badarpur power plant and maximize generation of power from existing natural gas based plants to reduce operation of coal based power plants in the NCR.	Chairpersons Delhi Pollution Control Committee, State Pollution Control Boards of Haryana, Rajasthan, and Uttar Pradesh	Not applicable
Intensify public transport services. Introduce differential rates to encourage off-peak travel.	Secretary cum Commissioner of Transport Department, NCT of Delhi, and Transport Commissioners of NCR towns Chairperson, Delhi Metro Rail Corporation (DMRC) Chairpersons, State Transport Corporations	Not applicable. However, the project site being close proximity to the Vishavidyalaya Metro station, use of Delhi Metro by the residents will always be priority.
Severe (ambient PM2.5or PM10concentration value is more than 250µg/m3 or 430µg/m3 respectively)	**Agency responsible/ Implementing Agency**	**Response of Young Builders Pvt. Ltd**
Increase frequency of mechanized cleaning of road and sprinkling of water on roads. Identify road stretches with high dust generation.	All road owning agencies including Municipal Corporations of NCT of Delhi and NCR towns, Public Works Departments and National Highway Authority of India	Mechanized cleaning and sprinkling of water will be done for internal roads within the project site.
Very Poor (ambient PM2.5or PM10concentration value is between 121-250µg/m3 or 351-430 µg/m3 respectively)	**Agency responsible /Implementing Agency**	**Response of Young Builders Pvt. Ltd**

Stop use of diesel generator sets	Chairpersons Delhi Pollution Control Committee, State Pollution Control Boards of Haryana, Rajasthan, Uttar Pradesh	Will be complied once directive issued by the competent authority
Enhance parking fee by 3-4 times	Municipal Commissioner Municipal Corporations of NCT of Delhi and NCR towns	Not applicable
Increase bus and metro services by augmenting contract buses and increasing frequency of service	Principal Secretary, Department of Transport of NCT of Delhi Delhi Transport Corporation (DTC) Delhi Integrated Multi-modal Transit System Ltd (DIMTS) Delhi Metro Rail Corporation (DMRC) State Transport Corporations in NCR towns	Not applicable
Stop use of coal/firewood in hotels and open eateries	Municipal Corporations of NCT of Delhi and NCR towns	Not applicable
Residential Welfare Associations and individual house owners to provide electric heaters during winter to security staff to avoid open burning by them	Resident Welfare Associations	Will be complied by providing electric heaters to the security staffs and strictly prohibiting open burning.
Alert in newspapers/TV/radio to advise people with respiratory and cardiac patients to avoid polluted areas and restrict outdoor movement.	Chairpersons, Delhi Pollution Control Committee, State Pollution Control Boards of Haryana, Rajasthan, and Uttar Pradesh	Not applicable
Moderate to poor (ambient PM2.5 or PM10 concentration value is between 61-120 µg/m3 or 101-350 µg/m3 respectively)	**Agency responsible/ Implementing Agency**	**Response of Young Builders Pvt. Ltd**
Stringently enforce pollution control in thermal power plants through PCB monitoring	Plant in-charge of power plants in NCR, and Delhi Pollution Control Committee and State Pollution Control Boards of Haryana, Rajasthan and Uttar Pradesh	Not applicable
Do periodic mechanized sweeping on roads with heavy traffic and water sprinkling also on unpaved roads every two days	Municipal Commissioner, Municipal Corporations of NCT of Delhi and NCR towns Commissioners, Traffic Police of Delhi and NCR towns to identify roads with heavy traffic and provide	Internal road of the project will be cleaned periodically by mechanized sweeping

	information to respective Municipal Commissioners	
	Chief Engineers of officers in charge of CPWD, PWD of Delhi and NCR towns to identify unpaved roads with heavy traffic and provide information to respective Municipal Commissioners	
Strict vigilance and no tolerance for visible emissions – stop plying of visibly polluting vehicles by impounding or heavy fine.	Commissioner or Officer in Charge, Transport Department and Traffic Police of NCT Delhi and NCR towns	No vehicles will be engaged which have visible emissions. Vehicles conforming PUC norms will only be engaged.
Strict vigilance and enforcement of PUC norms		
Stringently enforce rules for dust control in construction activities and close non-compliant sites	Commissioner or Officers in charge of Police Departments of Delhi and NCR towns	The project will strictly follow dust control norms as per (G.S.R. 94) dated 25th January, 2018
Deploy traffic police for smooth traffic flow at identified vulnerable areas	Commissioners Traffic Police of Delhi and NCR Towns	Not applicable
Strictly enforce Supreme Court order on diversion of non-destined truck traffic and ensure only trucks registered after 2005 are allowed entry into Delhi	Municipal Corporations of NCT of Delhi and NCR towns	Old vehicles registered beyond permissible duration will not be deployed in this project
	Traffic Police of NCT of Delhi and NCR towns	
Strictly enforce Supreme Court ban on firecrackers	Chief Controller of Explosives	Residents will comply with the directives issued by the competent authority
	Petroleum and Explosive Safety Organizations (PESO)	
	Commissioner of Officer in charge of licensing in the police departments of Delhi and NCR	
Ensure fly ash ponds* are watered every alternate day during summer months (March – May).	Plant in charge of Power Plants in Delhi and NCR towns	Not applicable
Moderate to poor(ambient PM2.5 or PM10 concentration value is between 61-120 µg/m3 or 101-350 µg/m3 respectively)	**Agency responsible/ Implementing Agency**	**Response of Young Builders Pvt. Ltd**
Information dissemination Social media, mobile Apps should be used to inform people about the pollution levels, contact details of control room, enable them to	Chairpersons, Delhi Pollution Control Committee, State Pollution Control Boards of Haryana, Rajasthan, and Uttar Pradesh	Not applicable

report polluting activities/sources to the concerned authorities, and actions that will be taken by government based on the level of pollution.		

Apart from the above, any direction from the Environment Pollution (Prevention & Control) Authority (EPCA) for the National Capital Region will strictly be followed as per directions issued from time to time.


1. North Delhi Metro Mall
2. Parsvnath
3. Northern India Paint
4. Godrej
5. Delhi Flour Mills
6. Negolice (M2k)
7. YBPL
Najafgarh Drain
(28°41'39.79"N, 77°12'52.00"E)
2 (28°41'45.91"N, 77°13'18.67"E)
1 (28°41'37.67"N, 77°13'16.06"E)
7
450 m
460 m
500 m
1800 m
Patel Chest
3 (28°41'21.01"N, 77°12'04.69"E)
4 (28°41'14.29"N, 77°10'47.55"E)
5 (28°40'05.18"N, 77°12'15.07"E)
RIDGE
YAMUNA

1219

Breakfast Corner
ब्रेकफास्ट
कॉर्नर
Takeout

Public Toilet
पब्लिक टॉयलेट

Bank Of India ATM
बैंक ऑफ़
इंडिया एटीएम

Chhatra Marg

Vishyavidyalaya
Metro Parking
विष्यविद्यालय
मेट्रो पार्किंग

Vishwavidyalaya
विश्व विद्यालय
मेट्रो स्टेशन

Canara Bank AT
केनरा बैंक ए.टी एम

SBM To
एसबीएम टॉ

Sulabh Toilet Complex
- Vishwavidyalaya
सुलभ शौचालय परिसर
- विश्वविद्यालय

Public Urinal
सार्वजनिक
मूत्रालय

Chhatra Marg

0

100.00 m

200.00 m

232.59 m

ducation,
y of Delhi
शिक्षा
विभाग, दिल्ली...

Frazer And Haws
फ्रेजर एंड हास

Gandhi Bhawan
गांधी भवन

School of Open
Learning, University of...

GC Narang Road

Cavalry Rd

Measure distance
Click on the map to add to your path
Total distance: 232.59 m (763.10 ft)

North Campus
नॉर्थ कैम्पस

Office Of The
University Engine
ऑफिस ऑफ द
युनिवर्सिटी...

Map data ©20

GOVERNMENT OF NATIONAL CAPITAL TERRITORY OF DELHI
HEAD QUARTERS: DELHI FIRE SERVICE: NEW DELHI - 110 001

No. F. 6. / DFS / MS / BP / 2021/ 305 Dated: 12/07/2021

ANNEXURE-R20

To

The Executive Engineer
Office of the Executive Engineer
Civic Centre, New Delhi.

Sub: Clearance of building plans in r/o Group housing at plot no. 1,3 Cavalry Lane & 4, Chhatra Marg, Near Vishwavidyalaya Metro Station, New Delhi .

Sir,

Please refer to online building plan vide request ID 10086152 on the above cited subject. In this connection, it is to inform you that the building plans in respect of proposed residential group housing have been scrutinized by this department from fire safety point of view and observed that there is a proposal of revised building plans for construction of residential blocks at Plot no. 1, 3 Cavalry Lane & 4 Chhatra Marg, near Vishwavidyalaya Metro Station, New Delhi on a plot area of 20,000 SQM. The plot abuts on 24 meter wide road and the premises are approachable by 06 meter wide main gates. All around 09 meter wide with 12 meter turning radius motorable road for fire tender movement is proposed to be provided all around the high rise building. **Two level basements beneath all the blocks are proposed in the complex**. The detail of each block is as under:

Sr. No.	Description of block	Composition of block	No. & size of staircases in each block	No. of lifts in each block	Height (M) At terrace level	Ground Covered area (SQM)	Fire check Floors and level
1.	Tower A (2DU per floor)	P1+P2+ St+38+ 2FCF	2 of 1.5 m each	4	145.30	445.59	02 at 71.85m, & 134.40m
2.	Tower B (2DU per floor)	P1+P2+ St+38+ 2FCF	2 of 1.5 m each	4	145.30	371.61	02 at 71.85m, & 134.40m
3.	Tower C (2DU per floor)	P1+P2+ St+38+ 2FCF	2 of 1.5 m each	4	145.30	371.61	02 at 71.85m, & 134.40m
4.	Tower D (Community Facility)	02 Levels above podium	2 of 2m each	3	19.05	1279.57	02 at 70.95m & 97.35m
5.	EWS (incl. Shop at ground floor)	G+28+1 FCF	2 of 1.5m each	6	99.250	475.42	01 at 73.05m,
6.	Basement	2 level	11 &1.5 m and 2 ramp of two way	24	--	14794.21 at UB & 15687.70 at LB	

Community facilities are proposed at two levels above podiums in tower D & shops are proposed at ground level of EWS tower. Parking is proposed in the basements and at ground & first floor below podium level. Ramp of 7.2 to 09 meter wide is also proposed in the building.

A common underground fire water tank of 4,50,000 litres capacity and fire pump house having six numbers electric driven pump of 2850 LPM capacity of 190 meter head each for hydrant network, sprinklers system, drencher system and water curtain system, three jockey pumps of 180 LPM capacity each, three diesel driven stand by pump of 2850 LPM capacity of190 meter head, terrace pump of 900 LPM at each tower are proposed to be provided in the building as per NBC-2016 Part-4.

Fire safety arrangements such as fire extinguishers, hose reel, wet riser/down comer, yard hydrant, automatic sprinkler system in entire floors of all towers including basement, automatic detection and alarm system, MOEFA, and terrace tank of 20,000 litres at each tower B,C & D and 10,000 liters at EWS block are proposed to be provided as per NBC-2016 Part IV.

Fire control room & Fire tower in each tower are proposed to be provided. Fire check floors in all towers having height more than 70 meter at immediately above 70 meter and above next 60 meter are also proposed to be provided.

Open set back area is not checked as it shall be checked by concerned building sanctioning authority.

There is no objection to this department for the construction of the said housing complex subject to the compliance of the following fire safety recommendations.

1. **Access to building:** The plot abuts on 24 & 18 meter wide road and the building is accessible through 06 meter wide main gates. The entrance gate shall fold back for free movement of fire service vehicles against the compound wall of the premises thus leaving the exterior access way with in the plot. The archway, if any, shall not be at a height less than 5 meters. Clear-cut 09 meter wide with 12 meter turning radius motorable road shall be ensured, all around the high rise block, for free movement of fire tender as per clause 8.2 of UBBL-2016.
2. **Number, width, Type and Arrangement of Exits:** The staircases as indicated in the table above shall be provided in various blocks and staircases which are serving to basement levels shall be segregated at ground floor. Width of corridor and exit in assembly area (community facilities) shall not be less than 2 meter. The staircase shall meet the requirements as per National Building Code of India Part 4/UBBL-2016. Clear-cut width of staircase and door shall be maintained at the time of completion. One staircase shall be **Fire Tower** in each block as per clause 9.3.13 of UBBL-2016.
3. **Protection of exits by means of fire check doors and or pressurization:** The fire check doors of minimum 2 hrs fire resistance rating shall be provided at the entrance of each staircase/lift lobby in the building and as marked on plans. Pressurization system for lift well and lift lobbies/ staircases or corridors shall be installed as per NBC-2016 Part IV and as per clause 9.3.2 of UBBL-2016.
4. **Compartmentation:** The building shall be suitably compartmentalized so that the fire / smoke remain confined to the area where fire incidents have occurred and does not spread to the remaining part of the building. This shall confirm to clause 8.4.6 of UBBL-2016/NBC-2016 Part-4. Fire check floors shall be provided as per clause 9.3.8 of UBBL-2016 as amended on 08.03.2019 and as mentioned in table above.
5. **Smoke Management System:** Smoke venting facilities shall be provided as per NBC Part IV, Fire and Life Safety. Mechanical extractors shall have an interlocking arrangements and the system shall be of such design as to operate on actuation of heat/ smoke sensitive detectors, sprinklers. Smoke extraction system shall be designed to permit 12 air changes per hour in case of fire in basement. A system of fresh air supply shall be provided at floor level and smoke outlet at ceiling level. Following points shall be ensured.

a. All ducting shall be constructed of substantial gauge metal conforming to IS: 655. Air duct serving main floor areas, corridors etc. shall not pass through the staircases enclosures.
b. Automatic fire dampers shall be provided in the ducts at the inlets of the fresh air and return air of each compartment/floor.
c. Automatic fire dampers shall be closed automatically upon operation of a detector/sprinkler.
d. The air ducts for every floor/compartment shall be separated. In no way inter-connected with the ducting of any other compartment.
e. Under no circumstances, plenum shall be used as "Return Air Passage" for air conditioning purposes.

6. **Fire Extinguishers:** The portable fire extinguishers of ISI mark suitable to risk shall be provided in all towers / buildings in accordance with IS -2190/ 1992.
7. **First aid Hose Reel:** Hose reel containing 30m length of 20 mm bore terminating into a shut-off nozzle of 5 mm outlet connected directly to riser shall be provided in all buildings. This shall conform to IS: 884/1998.
8. **Automatic Fire Detection and Alarming Systems:** Automatic fire detection system i.e. smoke / heat detection system shall be provided in the entire building of all blocks as per clause 9.3.9 of UBBL-2016. The system shall be connected to fire alarm system and shall conform to IS: 2189 /1999.
9. **Manually operated fire alarm system**: Manually operated fire alarm call points at suitable locations on each floor of all the buildings shall be installed as per National Building Code and the same shall conform to IS-2189/1999.
10. **Public Address System:** The public address system shall be provided in the all building, having loudspeakers in the common area. The microphone, amplifier and control switches of public address system shall be installed in the Fire Control Room as per UBBL-2016.
11. **Automatic Sprinkler System:** The Automatic sprinkler system shall be installed in entire floors of all building including basements in accordance with BIS: 15105 / 2002& E-6 of NBC-2016 part-4. Flow alarm switch/gong shall be incorporated in the installation for giving proper indication/sound. The pressure gauge shall also be provided near the testing facility. The entire system including pump capacity and head, size of pipe network, orifice control etc. shall be provided in accordance with the relevant code. The sprinkler shall be feed from the main and an alternate /standby riser with suitable isolation valve. Drencher system for fire check floor shall be provided and shall be feed from the water curtain pump. Fire service inlet shall also be provided at ground floor level.
12. **Internal Hydrant and Yard Hydrant:** Wet riser/ downcomer system near staircases shall be provided in all buildings as per IS 3844-1989. Down comer shall be directly connected to header of the pump from over head tank. Hose box of suitable dimension shall be provided near each internal hydrant. Its design shall be such that it can be readily opened in an emergency. Each box shall contain two lengths of 63 mm diameter, 15m length, rubber lined delivery hoses conforming to IS: 636 complete with 63 mm instantaneous coupling conforming to IS: 903 with a nozzle of 16 mm diameter. Yard hydrants shall be provided in the building premises as per NBC Part-4.
13. **Pumping Arrangements:** Fire pump house having one electric driven pump of 2850 LPM capacity of 190 meter head for hydrant network, 01 electric pump of 2850 LPM capacity of 190 meter head for sprinkler system , two jockey pump of 180 LPM capacity each, one diesel driven stand by pump of 2850 LPM capacity of 190 meter head, terrace pump of 900 LPM at each block and one diesel pump of 2850 LPM against the requirement of additional set of pump shall be provided in the complex

as per NBC-2016 part-4. Moreover, one electric pump of 2280 LPM, 01 diesel pump of same capacity for standby & 01Jockey pump of 180 LPM for water curtain in the basement & drencher system for fire check floor shall also be provided as per NBC-2016 Part-4. The suitable orifice plate /reducer shall be provided to maintain the requisite pressure of 3.5 Bars at the remotest point. All the pumps shall be automatic in operation.

14. **Captive Water Storage for fire fighting:** An underground fire water storage tank of 4,50,000 litre capacity and terrace tank of 20,000 litres on the terrace of blocks B,C & D and 10,000 litres on EWS shall be provided. The underground water storage tanks shall be approachable by the fire engine. Draw off connection/ fire service inlet shall be provided. The replenishment through bore well or from the town main be ensured @ 1000 LPM. One ladder or any other form of open access to the overhead fire water tank for inspection shall be provided as per clause 7.10.3 of UBBL-2016. This shall conform to the requirements given in National Building Code of India Part IV/UBBL-2016.
15. **Exit Signage:** Exit signages shall be provided in the building at appropriate locations. Floor level marking, all exits and exit way marking signs in entire complex must be illuminated and wired to independent circuit supplied by alternate source of power supply. Wiring for the illuminated exit signs shall be suitably protected against fire. Illuminated / glowing paint strips shall be provided at each level to guide the direction for escaping towards a safe place. The size and colour of the exit signs shall be as per IS 9457: 1980.
16. **Provision of lifts:** Lifts as mentioned in the table above are proposed to be provided in the various buildings block. The lifts shall be equipped with a fireman's grounding switch so that it is possible to ground the lifts during a fire/ emergency. In case of failure of normal supply, it shall automatically trip over to the alternate supply. Suitable slope in the floor of lift lobby shall be made to prevent water, used during fire fighting etc. at any landing, from entering into lift shaft. All other conditions and provisions shall be provided strictly in accordance to National Building Code of India Part IV/UBBL-2016.
17. **Standby Power Supply:** Emergency lighting, exit signs, staircase and corridor lighting circuit, lift, fire pumps smoke extraction system and pressurization shall be powered from an additional source of power supply like generator and shall be automatic in action. The emergency lighting system shall be capable of continuous operation for a minimum duration of 1hour and 30 minutes. The emergency lighting shall be provided to be put on within 1 second of the failure of the normal lighting supply.
18. **Refuge Area**: Not applicable as per UBBL-2016 /NBC Part-4. However refuse floors as proposed on plans in all high rise blocks shall be provided.
19. **Fire Control Room:** As proposed on the building plans fire control room in each building shall be provided in accordance with the provisions contained in NBC- 2016, Part-IV Fire and Life Safety/as per clause 9.3.10 of UBBL-2016. Trained personal shall be appointed round the clock to look after the fire protection arrangements in the building.
20. **Special Fire Protection Systems for Protection of Special Risk:** The electric sub-station if constructed installation of Transformer, LT & HT panels shall be as per the provisions specified by the Electrical Authority. However, the following points shall be followed:-

    a. The HT & LT panels shall be separated with the walls of 02 hours fire resistance rating. It is necessary to separate shield wall extending up to the one meter on sides above the highest point of the transformer. Fire protection for transformer and panel shall be provided as per clause 5.1.4,5.1.5 & 5.1.6 of NBC part-4 .

b. The electrical distribution cables/wiring shall be laid in a separate duct. The duct shall be sealed at every floor with non-combustible materials having the same fire resistance as that of the duct. Low and medium voltage wiring running in shaft and in false ceiling shall run in separate conduits.
c. Water mains, telephone lines, intercom lines, gas pipes or any other service line shall not be laid in the duct for electrical cables; use of bus ducts/ solid rising mains instead of cables is preferred.
d. Separate circuit for fire fighting pumps, staircases and corridor lighting and blowers for pressurizing system shall be provided directly from the main switch gear panel and these circuits shall be laid in separate conduit pipes, so that fire in one circuit will not affect the others.
e. The inspection panel doors and any other opening in the shafts shall be provided with air tight doors having fire resistance of not less than 2hrs. The electric installations shall be as per BIS 1646.
f. The fire protection for kitchen shall be provided as per clause annex-G of NBC part-4/2016.

The approval of building plans shall be valid only for the present layout of the floors; any subdivision of the floors shall only be done by ensuring the proper means of escape, with the prior approval of this department. It shall be ensured that provisions of all requisite fire and life safety measures stipulated in National Building Code of India/UBBL-2016 shall be complied in letter and spirit before the occupancy of the building under intimation to this department. The fire safety guidelines/recommendations issued vide letter No F.6/DFS/MS/BP/2019/259, dated 12.07.2019 shall stand null and void .For any complaint/ grievances regarding building permit please contact on mail id hpc_buildingpermit@dda.org.in.

Yours faithfully

(Atul Garg)
Director
Delhi Fire Service

GOVERNMENT OF NATIONAL CAPITAL TERRITORY OF DELHI
DIRECTORATE OF DELHI FIRE SERVICE: NEW DELHI – 110001

No. F6/DFS/MS/BP/2021/ 116 Dated: 04.06.2021

ANNEXURE-R21

To

The Executive Engineer (Bldg.) HQ,
North Delhi Municipal Corporation,
8th Floor, Civic Centre, JLN Marg, New Delhi- 110002.

Sub: - Clearance of building plans from fire safety point of view in r/o proposed construction of Residential Group Housing Building situated at Plot No. 1, 3 Cavalry Lane, & 4, Chhatra Marg, Near Vishwavidyalaya Metro Station, Delhi.

Sir,

Please refer to **Request ID No. 10086152** of online building plans, on the subject cited above. In this connection, the referred online building plans in respect of proposed construction of Residential Group Housing Building situated at Plot No. 1, 3 Cavalry Lane, & 4, Chhatra Marg, Near Vishwavidyalaya Metro Station, Delhi have been scrutinized from fire and life safety point of view and observed that there is proposal for construction of Group Housing Residential Occupancy building on a plot area of 20000m^2. The following shortcomings were observed:-

1. Transformer room, D.G. Plant room, HT Panel room etc. are not separated/ compartmented with other areas with fire rated shutters.
2. Segregation of staircases at ground floor is not proposed as per UBBL 2016.
3. 09/06m wide motorable road all around the building blocks is not proposed as per clause No. 8.2 of UBBL 2016.
4. The design of fire tower is not proposed as per UBBL/NBC Part-IV.
5. All the exit doorways shall be openable from the side which they serve as per clause 7.12.5 of UBBL 2016.
6. Width of the staircases is not mentioned on the plans.
7. Entry to the residential flats and fire check floors has been blocked by the wall.
8. Nomenclature of the compartment door in EWS is not mentioned.
9. 2 exits of 2m width are not proposed in assembly areas like, Gym, Play Zone, Squash Court etc.
10. Entry to staircase and lift lobby is not through FCD in Club Building.
11. One staircase and two lifts are proposed in club building which are not opening at any floor.

In view of the above, the building plans may be rejected with a request to resubmit plans after rectification of above shortcomings for further consideration in the matter.

Yours faithfully,

(Atul Garg)
Director
Delhi Fire Service

FORM- B-1

(Chapter 2, Para 2.3)

GRANT OF SANCTION

NAME OF THE SANCTIONING AUTHORITY NORTH DELHI MUNICIPAL CORPORATION

Building Department (HQ) / HQ Zone

File No. 10086152 Dated: 24/07/2021

To,

Ms Young Builders Pvt Ltd
43,Babar Road,New Delhi
New Delhi

GRANT OF SANCTION

Sub: Sanction Under Clause 336 of Delhi Municipal Corporation Act, 1957

Dear Sir/Madam,

With reference to your application dated **06/07/2021** for the grant of sanction to erect/re-erect/add to/alteration in the building to carry out the development specified in the said application relating to Plot no. **1 3 4**,Pocket no. _____, Block no. **HQ**,Sector no. _____, Situated in/ at **1,3 Cavlary Lane 4 Chhatra marg,Delhi**. I have to state that the same has been sanctioned on **23/07/2021** by the MCD subject to the following conditions and corrections made on the plans:-

1. The plans are valid up to 23 day of month Jul year 2026.

2. The construction will be undertaken as per sanctioned plan only and no deviation from the bye-laws will be permitted without prior sanction. Any deviation done against the bye-laws is liable to be demolished and the supervising Architect, engaged on the job will run the risk of having his license cancelled.

3. Violation of building bye-laws will not be compounded.

4. It will be duty of the owner of the plot and the Architect preparing the plan to ensure that the sanctioned plans are as per prevalent building bye-laws. If any infringement of the bye-laws remains unnoticed the NORTH DELHI MUNICIPAL CORPORATION reserves the right to amend the plans as and when the infringement comes to its notice and NORTH DELHI MUNICIPAL CORPORATION will stand indemnified against any claim on this account.

5. The party shall not occupy or permit it to occupy the building or use permit the building or part there of affected by any such work until occupancy certificate is issued by the sanctioning Authority.

6. NORTH DELHI MUNICIPAL CORPORATION will stand indemnified and kept harmless from all proceedings in courts and before other authorities of all expenses/losses/claims which the NORTH DELHI MUNICIPAL CORPORATION may incur or become liable to pay as a result or in consequences of the sanction accorded by it to these building plans.

7. The door and window leaves shall be fixed in such a way that they shall not when open project on any street.

8. The party will convert the house into dwelling units of each floor as per the approved parameters of the project and shall use the premises only for residential purpose.

9. The building shall not be constructed within minimum mandatory distance as specified in Indian Electricity Rules

10. The land left open on consequences of their enforcement of the set back rule shall form part of the public street.

11. The thickness of outer walls will be maintained at least 0.23 mt. (9").

12. The basic levels should be got ascertained from the concerned at the site of the construction.

13. The owner will display boards of minimum size of 3 ft. X 4ft. indicating the following

i. Plot No. and location

.....

ii. Name of lessee/owner

.....

iii. Use of the property as per lease deed

.....

iv. Date of sanction of Building Plan with No.

.....

v. Sanction valid up to

.....

vi. Use of different floors and areas sanctioned

.....

vii. Name of the Architect & his address

.....

viii. Name of the contractor and his address

.....

14. The provision of the display board on the construction site is a mandatory requirement and non-compliance of the same will invite a penalty of Rs. 5000/-.

15. It will be ensured that the construction / demolition work shall be carried out in such a manner that no disturbance/nuisance is caused to residents of the neighborhood.

16. It will be ensured by the owner and the Architect that during the construction the building plans sanctioned shall satisfy all the Environmental Conditions for Buildings and Constructions of Chapter 3, Annexure XIV of these Bye laws and as amended from time to time or any specific orders issued by the Govt.

17. Intimation of Completion of work up to Plinth Level, Plinth Level inspection and the issue of Plinth level Inspection shall be done as per procedures laid down in the Chapter 2 of these bye-laws

18. The building shall be constructed strictly in accordance with the sanction plan as well as in accordance with the certificate submitted jointly by the owner/Architect/Structural Engineer for safety requirement as stipulated in Chapter 9 of these Building Bye-Laws, and the structural Design including safety from any natural hazards duly incorporated in the design of the building as per the Government Of India Notification issued time to time and Annexure VII of theses Bye Laws.

19. The mulba during the construction will be removed on weekly basis. If the same is not done, in that case the local body shall remove the mulba and the cost shall be borne by the owner of the plot.

means of erecting a screen wall not less than 8 ft. in height from ground level which is to be painted to avoid unpleasant look from the road side. In addition to this a net or some other protective material shall be hoisted at the facades or the building to ensure that any falling material remains within the protected area.

21. Noise related activities will not be taken up for construction at night after 10.00 PM.

22 (i) Every builder or owner shall put tarpaulin on scaffolding around the area of construction and the building. No person including builder, owner can be permitted to store any construction material particularly sand on any part of the street, roads in any colony.

(ii) The construction material of any kind that is stored in the site will be fully covered in all respects so that it does not disperse in the air in any form.

(iii) The construction material and debris shall be carried in the trucks or other vehicles which are fully covered and protected so as to ensure that the construction debris or the construction material does not get dispersed into the air or atmosphere, in any form whatsoever.

(iv) The dust emissions from the construction site should be completely controlled and all precautions taken in that behalf.

(v) The vehicles carrying construction material and construction debris of any kind should be cleared before it is permitted to ply on the road after unloading of such material.

(vi) Every worker working on the construction site and involved in loading, unloading and carriage of construction material and construction debris shall be provided with mask to prevent inhalation of dust particles.

(vii) Every owner and or builder shall be under obligation to provide all medical help, investigation and treatment to the workers involved in the construction of building and carry of construction material and construction debris relatable to dust emission.

(viii) It shall be the responsibility of every builder to transport construction material and debris waste to construction site, dumping site or any other place in accordance with rules and in terms of this order.

(ix) All to take appropriate measures and to ensure that the terms and conditions of the earlier order and these orders should strictly comply with by fixing sprinklers, creations of green air barriers.

(x) Compulsory use of wet jet in grinding and stone cutting.

(xi) Wind breaking walls around construction site.

(xii) All efforts to be made to increase the tree cover area by planting large number of trees of various species depending upon the quality content of soil and other natural attendant circumstances.

(xiii) All the builders who are building commercial, residential complexes which are covered under the EIA Notification of 2006 shall provide green belt around the building that they construct.

23. The sanctioning authority approves Architectural Drawings/Development Control norms with respect to the Building Bye Laws and Master Plan provisions only. The technical drawings/documents submitted by the owner/consultant/Architect/Engineer/Structural Engineer/Landscape Architect /Urban Designer/Engineer for Utility Services are considered as part of the records/information supporting the building permit only. The responsibility of the correctness of information/application of technical provisions fully vests with the owner/consultant/ Architect/Engineer/Structural Engineer/Landscape Architect /Urban Designer/Engineer for Utility Services and shall be liable as per laws.

24. No puncture, perforation, cutting, chiseling, trimming of any kind for any purpose are permitted in the structural members(beams / columns)submitted by the structural engineer as structural drawing for building permit in accordance with the relevant structural codes.

25. The sanction will be void ab initio if any material fact has been suppressed or mis-represented of if auxiliary conditions mentioned above are not complied.

Situated in/at. 1,3 Cavlary Lane 4 Chhatra marg,Delhi
Delhi.

Note: - Given below is the Remark provided by concern sanctioning authority:-

"This sanction has been accorded under EODB on the basis of documents undertaking submitted by the Owner & Architect. In case any misrepresentation / discrepancy in respect of the provision of MPD, UBBL, Other zoning regulations and statutory requirement is observed at any stage, the sanction shall be deemed revoked besides other action as per Law.
DFS department dated 12/07/2021 has approved the proposal. It shall be ensured that provisions of all requisite fire and life safety measures stipulated in DFS approval, UBBL-2016 & National Building Code of India Part-IV shall be complied in letter and spirit before the occupancy of the building.
All the observations/conditions of DJB , DUAC,EC provided in NOC are to be complied by the applicant in letter and spirit before the occupancy of the building.
This sanction granted under EODB shall not be construed to authorize any person to do anything in contravention or against the terms of lease or title of the land or against MPD, any regulations, bye-laws, ordinance, etc.
"

Encl: One set on sanctioned plan

Yours Faithfully

Assistant Engineer (Building)

HQ /HQ Zone(digital signature)

Validity unknown

For Commissioner, NORTH DMC
Digitally signed by PRADEEP KUMAR SHARMA
Date: 2021.07.24 12:19:48 IST

Copy to: (1) E.E. (B)Civil Lines Zone

(2) AA & C (HQ/HQ Zone)

PRESENTATION ON ENVIRONMENT CLEARANCE

FOR ANNEXURE R23 (COLLY)

PROPOSED GROUP HOUSING PROJECT AT 1,3 CAVALRY LANE & 4 CHHATRA MARG NEAR VISHWAVIDYALAYA METRO STATION NEW DELHI

BEFORE

EXPERT APPRAISAL COMMITTEE, MoEF & CC

File No. IA3-21/15/2021-IA.III

Date: 1st March 2021

S. No. 62.3.1

Proponent :
M/s Young Builders Pvt. Ltd.
43, Babar Road, Near Bengali Market,
New Delhi - 110001

Environmental Consultant :
Ind Tech House Consult, Delhi
G-8/6, Sector-11, Rohini, Delhi-110085
QCI Sl. No. 86

NABET Accreditation Certificate No: NABET/EIA/1821/RA 0098 Valid till: 30.04.2021

PRESENTATION OUTLINE

- Introduction
- Project description
- Baseline Information
- Environment Monitoring Plan
- Environment Management Plan

NABET ACCREDITATION LETTER

Quality Council of India

National Accreditation Board for Education & Training

CERTIFICATE OF ACCREDITATION

Ind Tech House Consult

Ground Floor, G-8/6, Rohini, Sector -11, Delhi – 110089

Accredited as **Category - A** organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA-EMP reports in the following Sectors:

Sl. No.	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals opencast only	1	1 (a) (i)	A
	Mining of minerals underground mining			B
2	Offshore and onshore oil and gas exploration, development & production	2	1 (b)	A
3	River Valley projects	3	1 (c)	A
4	Petro-chemical complexes	18	5 (c)	A
5	Synthetic organic chemicals industry	21	5 (f)	B
6	Oil & gas transportation pipeline, passing through national parks/ sanctuaries/coral reefs /ecologically sensitive areas including LNG terminal	27	6 (a)	A
7	Isolated storage & handling of Hazardous chemicals	28	6 (b)	B
8	Ports, harbours, break waters and dredging	33	7 (e)	B
9	Aerial ropeways	35	7 (g)	B
10	Common Municipal Solid Waste Management Facility (CMSWMF)	37	7 (i)	B
11	Building and construction projects	38	8 (a)	B
12	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RA AC minutes dated Jan. 16, 2018 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/18/0740 dated Sep. 05, 2018.The accreditation needs to be renewed before the expiry date by Ind Tech House Consult, Delhi, following due process of assessment.

Sr. Director, NABET
Dated: Sep.05, 2018

Certificate No.
NABET/ EIA/1821/ RA 0098

Valid till
31.01.2021

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

VALIDTY EXTENSION LETTER

National Accreditation Board for Education and Training

(Member - International Accreditation Forum & Pacific Accreditation Cooperation)

QCI/NABET/ENV/ACO/21/1609

February 01, 2021

To
Ind Tech House Consult,
Ground Floor, G-8/6,
Rohini, Sector 11
Delhi-110089
(Kind Attention- Mr. Anand Kumar Dubey)

Sub.: Extension of Validity of Accreditation till 30th April, 2021 - regarding

Dear Sir/Madam

In view of the outbreak of Corona Virus (COVID-19) and subsequent lockdown declared for its control vide order dated 24th March 2020, issued by Ministry of Home Affairs, Govt. of India, NABET hereby extends the Validity of your Accreditation till 30th April, 2021.

Meanwhile, you may enclose this with your EIA reports along with the certificate/validity letter. The EAC/SEIAA/SEAC/Other are hereby requested to consider the same as a valid document for the preparation of EIA/EMP report.

With best regards

(A K Jha)
Sr. Director, NABET

SALIENT FEATURES

- The project in question is a category 8(a) Building and Construction Project.
- Form 1, 1A and conceptual Plan have been submitted as per the requirements and will be presented
- General Conditions are not applicable
- Guidelines for location near Critically polluting areas are not applicable.
- Project in line with most predominant and prescribed land use. Meets the Aesthetics for the Area.
- A number of similar type of projects with multi-basements (existing/upcoming) near the project site
- No National Park/WLS or Eco sensitive zone near the site
- Outside the morphological limits of the Ridge Forest. No impact on flora and fauna of the ridge forest. No clearance required from Ridge Management Board.
- No water body within 500 m of the project site
- No use of ground water during construction or operation phase unless otherwise directed by the Regulatory Authorities
- Excavation for basement is expected to be below ground water level
- Suitable drainage will be provided for backup of ground water. Other projects also operating.

SALIENT FEATURES

- Dewatering during construction of basement – after due permission from concerned authority
- Project has been designed to meet the ECBC Eco Nivas Samhita compliance by 'Whole Building Performance' approach.
- No significant impact on Level of service of surrounding roads
- Building structurally designed as per IS Codes and NBC for earthquake resistance
- Construction Wastes and Hazardous Wastes shall be treated in line with the rules
- Treated Wastewater to be recycled and reused . Excess treated water to Common STP through public sewer. *(Treated waste water from STP will be used for watering road side plantations, dust suppression, watering in DDA parks etc. on demand in consultation with DDA/ PWD/ Forest Department)*
- Negligible impacts on Air and Water Quality
- Earlier EC granted by SEIAA, Delhi in 2012 and 2018. Appeals and representations filed by DU have been disallowed in various courts. NGT Constitute Committee. The project was recommended viable by Committee constituted by the NGT.
- Application filed before the EAC because of some modifications in Unified Building Bye-Laws 2016 which lead to change in the building plan

INTRODUCTION

- Proposed Group Housing Project At 1,3 Cavalry Lane & 4 Chhatra Marg Near Vishwavidyalaya Metro Station New Delhi.

- The total plot area is **20,000 m^2** and built-up area will be **137879.64 m^2.**

- Maximum no of floors is 2 Basement+2 podium + 1 stilt + 2 fire check floors + 36 typical floors + 2 floor pent house (i.e. 2 basement + 43 floors.

- Total no of DU's is **222 nos.** and EWS is **224 nos.**

- Estimated cost of project is **Rs. 494.2 Cr.** (276 Crores + 218.2 land cost).

- The built up area of the project is more than 20,000 sq. m. and less than 1,50,000 sq.m. Hence the project falls under "8(a) Category Project" – Building and Construction projects as per EIA notification dated 14th September, 2006.

- In absence of SEIAA, Delhi the project has been applied to Expert Appraisal Committee for Environment Clearance

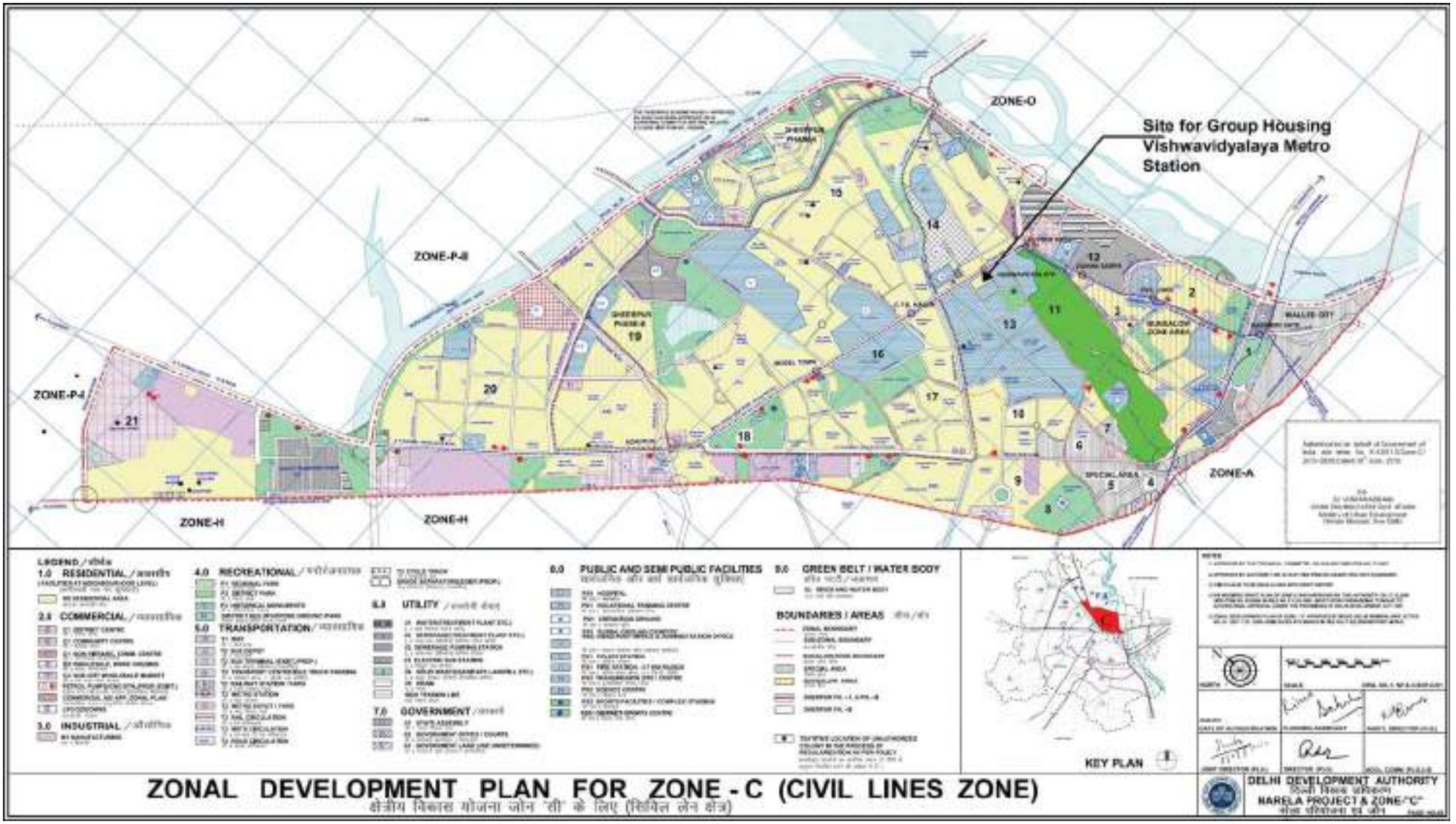
PROJECT BACKGROUND

- This plot (20,000 sqm/ 2 ha) is a part of 3.05 ha land acquired by Delhi Metro Rail Corporation Ltd. (DMRC) from Ministry of Defence under an award in 2001.
- DMRC is mandated to generate resources through property development on surplus land available after construction of metro station. DMRC got the land use of 3.05 ha land changed from 'Public & Semi Public' to Residential through Delhi Development Authority vide notification dated 23.09.2005.
- DMRC advertised / issued RFP in 2008 for property development – Group Housing on the stated surplus land of 2.0 ha (20,000 sqm), invited bids and conducted auction on 28.07.2008. DMRC accepted highest bid and granted leasehold rights to M/s Young Builders Pvt. Ltd. for development of a group housing on this plot
- The project had earlier obtained environmental clearance from SEIAA - Delhi vide EC Letter No.- DPCC/SEAC/50/SEIAA/1/2012 dated 13/08/2012.
- The project had again obtained environmental clearance from the SEIAA – Delhi vide EC Letter No.- SEIAA-D/C-353/EC-350/2018 dated 23/03/2018 due to increase in FAR area of the project and revision in the project planning.
- In past, the project had been subject to a number of litigations. As per the last hearing in Hon'ble NGT, we declared that the project design has again changed and require environmental clearance. Hon'ble NGT, vide its vide appeal No. – 112/2018 and order dated 10-12-2020, suggested to apply fresh environmental clearance for this project. **At present no litigation is pending at project site.**
- No construction activity was undertaken till date apart from the site barricading.

BRIEF OF COURT CASE EARLIER

Details of Case No.	Orders/directions of the court
Writ Petition No. 3135/2010 (Hon'ble Delhi High Court)	YBPL challenged the reduced FAR – Writ Petition No. 3135/2010 was disposed-off on 18.05.2011 allowing 200 FAR and no height restriction to the project
Writ Petition No. 2743/2012 (Hon'ble Delhi High Court)	DU challenged Land use, FAR and Height - Writ Petition No. 2743/2012 was dismissed in Hon'ble Delhi High Court on 27.04.2015. Follow through LPA No. 89/2018 was again dismissed by the Delhi High Court on 29.10.2018. SLP No. 5581/2019 finally dismissed by Hon'ble Supreme Court on 17.12.2019
Writ Petition No. 8675/2011 (Hon'ble Delhi High Court)	Association of Metro Commuters challenged land auction by DMRC on ground of parking requirements at Vishwavidyalaya Metro Station - Writ Petition No. 8675/2011 was dismissed in Delhi High Court on 14.12.2011
Writ Petition No. 6624-6625/2012 (Hon'ble Delhi High Court	Lessee's challenged land auction by DMRC on ground of wrongful acquisition/public purpose - Writ Petition No. 6624-6625/2012 was dismissed in Delhi High Court on 10.09.2013. Follow through SLP No. 5014/2014 was also dismissed by the Hon'ble Supreme Court on 14.02.2014
Appeal No. 112 of 2018 (Hon'ble NGT)	Appeal No. 112 of 2018 was dismissed on 20.01.2021. YBPL requested to seek fresh EC approval due to change in overall project layout because of certain change in Unified Building Bye Law (UBBL) 2016. Hon'ble NGT dismissed the appeal as infructuous and directed YBPL to make a fresh application as per law

PROJECT SITE LOCATION ON ZONAL DEVELOPMENT PLAN



SIMILAR PROJECT NEARBY

S. No.	Project	Date of Environmental Clearance	Built-up Area, Sqm	DUs/ EWS	Height (m)	Number of Basements	Parking (ECS)	Distance from Yamuna (m)	Distance from Ridge (m)
1	**Young Builder (P) Ltd**	**This project**	**137879.64**	**DUs – 222 EWS – 224**	**157.8**	**2**	**860**	**1800**	**500**
2	North Delhi Metro Mall	15.11.19	1,60,375	-	44.1	4	1894	1300	- -
3	Parsvnath Landmark	14.07.20	2,55,262	DUs - 505 EWS – 390	125.6	3	3256	40	180
4	Negolice India (M2K)	13.01.21	1,72,855	DUs - 488 EWS – 287	235.0	3	1804	4980	4070
5	Delhi Floor Mills Co. Ltd.	17.09.19	1,32,957	DUs - 346 EWS – 276	165.0	3	1143	2860	420
6	DCM Ltd	19.09.17	10,05,604	Not availab le	180	3	9858	3970	- -
7	DLF Home Developers	11.10.19	10,00,727	DUs - 2900 EWS - 1862	179.2	4	8836	7900	- -

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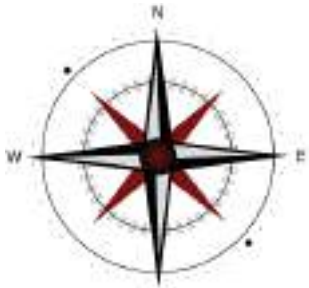
Project Vicinity Map

- Map showing neighboring projects and key locations in the project vicinity



PROJECT SITE LOCATION ON GOOGLE EARTH

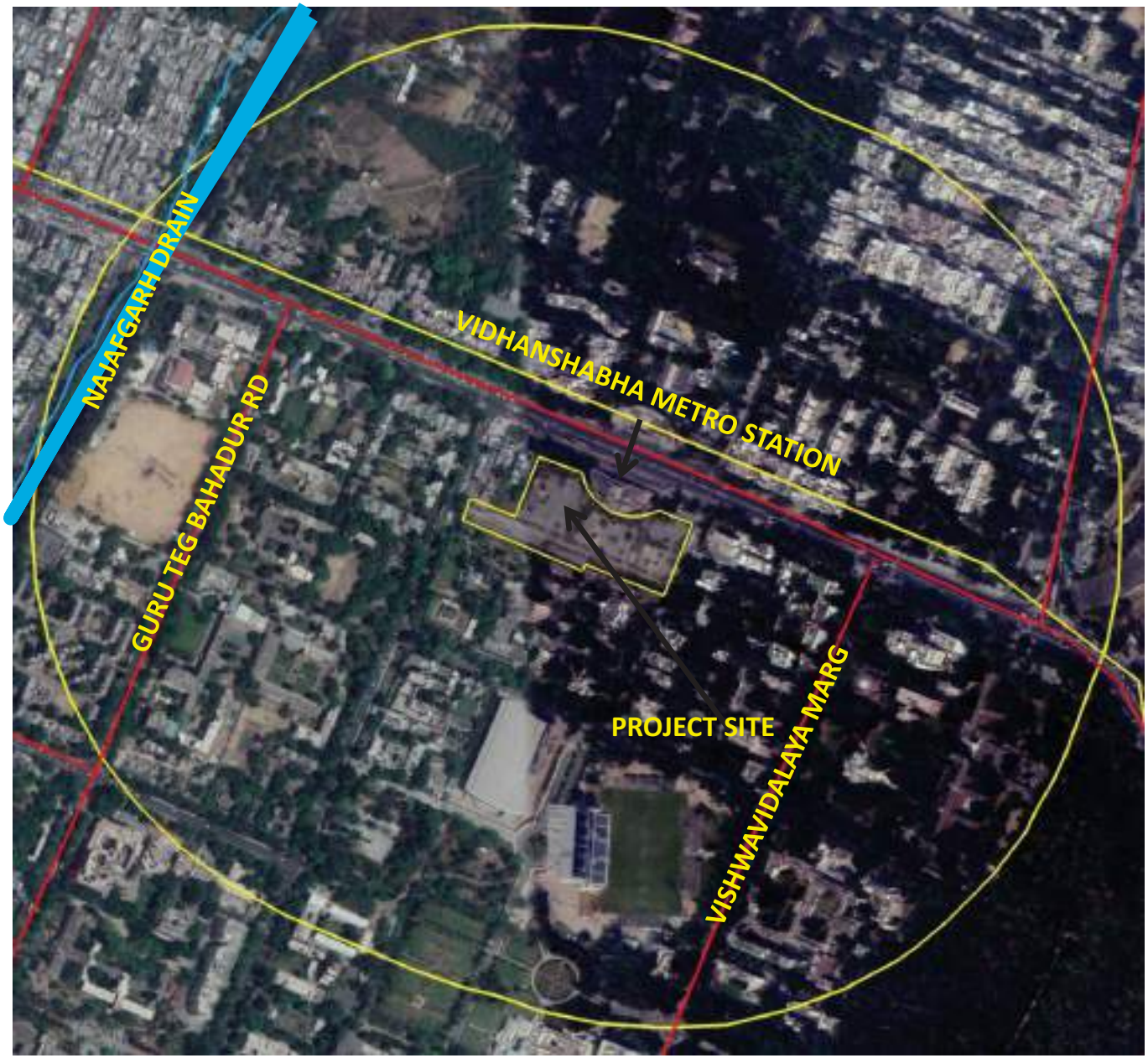




2 KM

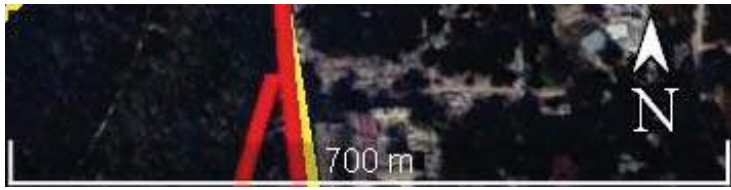
Project site Coordinate	28°41'39.79" N, 77°12'52.00" E
★	Project Site
	Road
	River/Drain
	Metro Line

500 METER BUFFER MAP ON GOOGLE EARTH





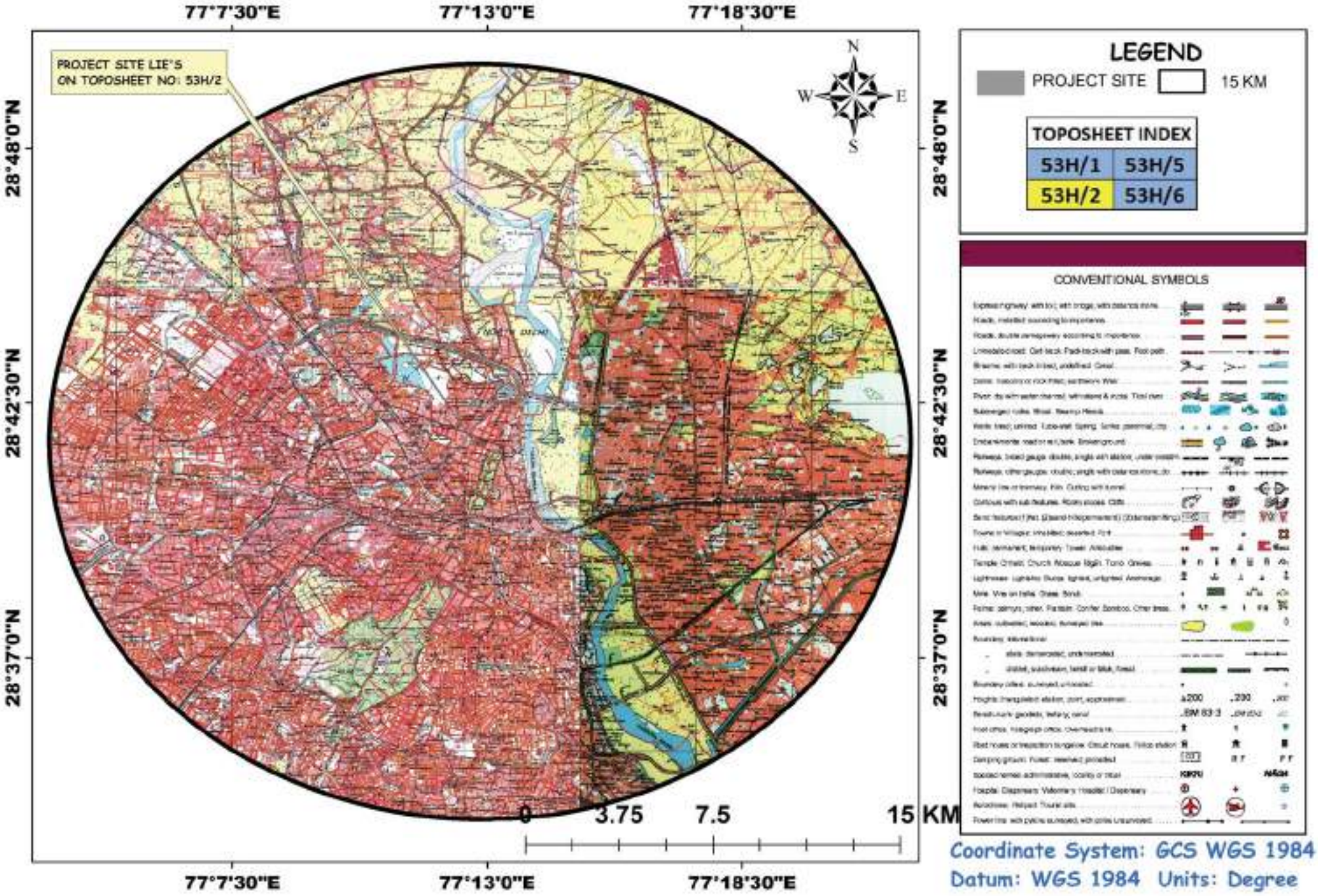
S. NO.	COORDINATE
A	28°41’40.77” N, 77°12’45.87” E
B	28°41’40.12” N, 77°12’47.89” E
C	28°41’42.34” N, 77°12’48.92” E
D	28°41’39.84” N, 77°12’55.45” E
E	28°41’37.14” N, 77°12’54.23” E
F	28°41’39.98” N, 77°12’45.82” E



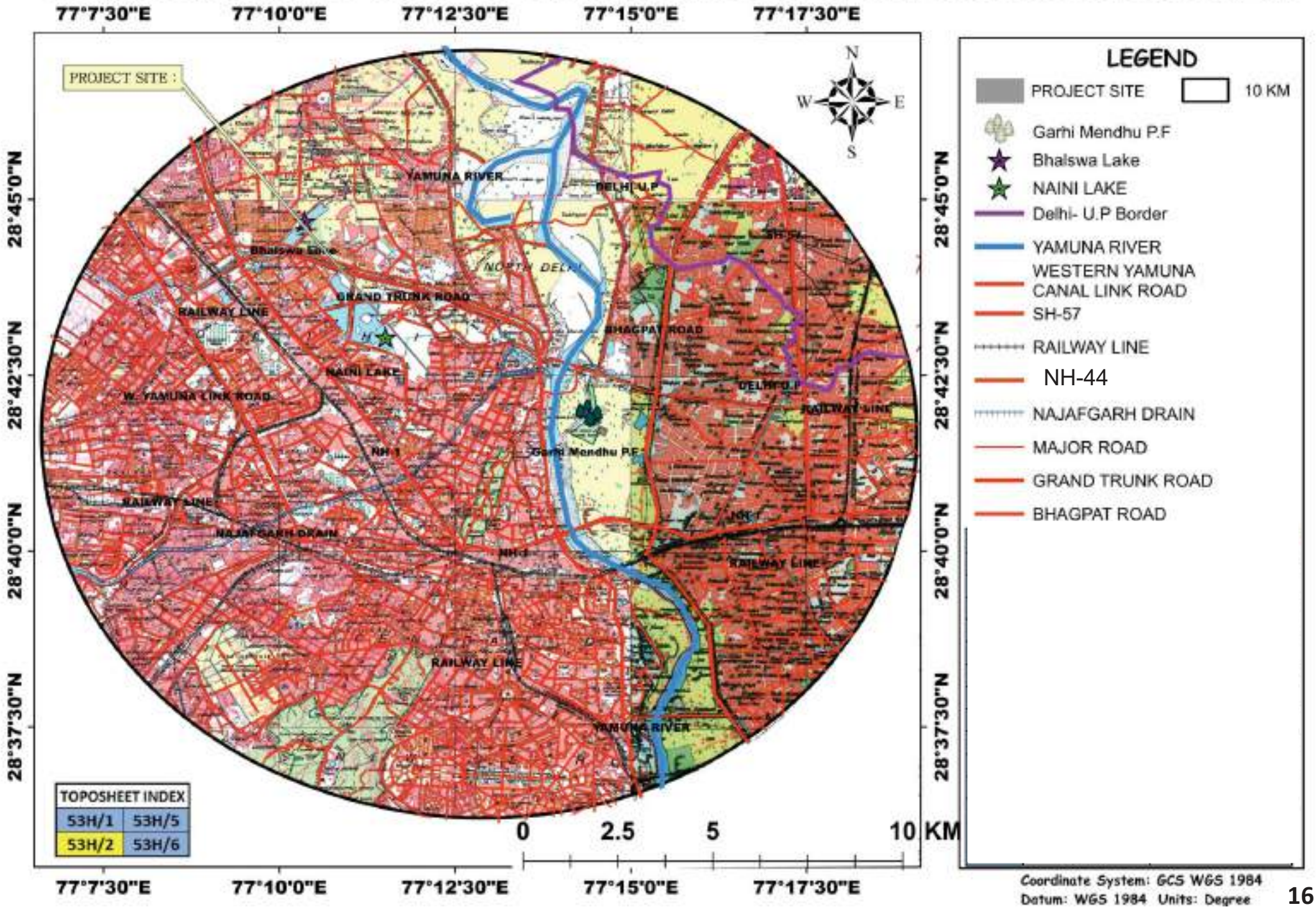
ADJACENT FEATURES OF THE PROJECT SITE



15 KM RADIUS BUFFER MAP OF PROJECT SITE ON GOREFRENCED TOPOSHEET



10 KM SENSITIVITY MAP OF PROJECT SITE ON GEOREFRENCED TOPOSHEET



SURROUNDING FEATURES & ENVIRONMENT SENSITIVE PLACES

SN	Type of Facility	Name of Facility	Distance from Project Site	Direction w.r.t. Project Site
1.	Roads	NH-44 NH-9 SH-57 NH-48	0.03 km 2.20 km 7.82 km 12.01 km	North North East South East South West
2	Metro Rail	Vishwavidyalaya Metro station	Adjacent	North
		GTB Nagar Metro Station	0.6 km	North West
		Vidhan Sabha Metro Station	0.85 km	South East
		ISBT Kashmere Gate Metro Station	3.14 km	South East
3	Railway Stations	Azadpur Railway Station	3.27 km	West
		Sabzi Mandi	3.09 km	South West
		Old Delhi Railway Station	3.68 km	South East
		Kishanganj Railway Station	3.49 km	South West
		Sarai Rohilla Railway Station	4.25 km	South West
		New Delhi railway station	4.87 km	South East
4	Airport	Hindon Airport IGI airport	12.20 km 16.32 km	North East South West
5	Water Body	Najafgarh Drain Yamuna River	0.45 km 1.5 km	West East
6	Hospital	Sant Parmanand Hospital Patel Chest Hospital Hindu Rao Hospital	2.0 km 460 m 1.9 km	South East South west South
7	Defense installations	Delhi Cantonment	12.10 km	South
8	State/National boundaries	UP Delhi Border	6.7 km	North East
9	National Park	Nill	Not located within the 15 km of the project	
10	Wildlife / Bird Sanctuary	Nill	Not located within the 15 km of the project	
11	Reserve Forest/ Forest/ Wetland/ Biodiversity Park	Yamuna Biodiversity Park Garhi Mendhu PF Northen Ridge*	3.85 km 2.6 km 500 m	North East East

** The project site is Out side Ridge morphology*

SITE PHOTOGRAPHS



Defunct Toilet



North View



West View





East View

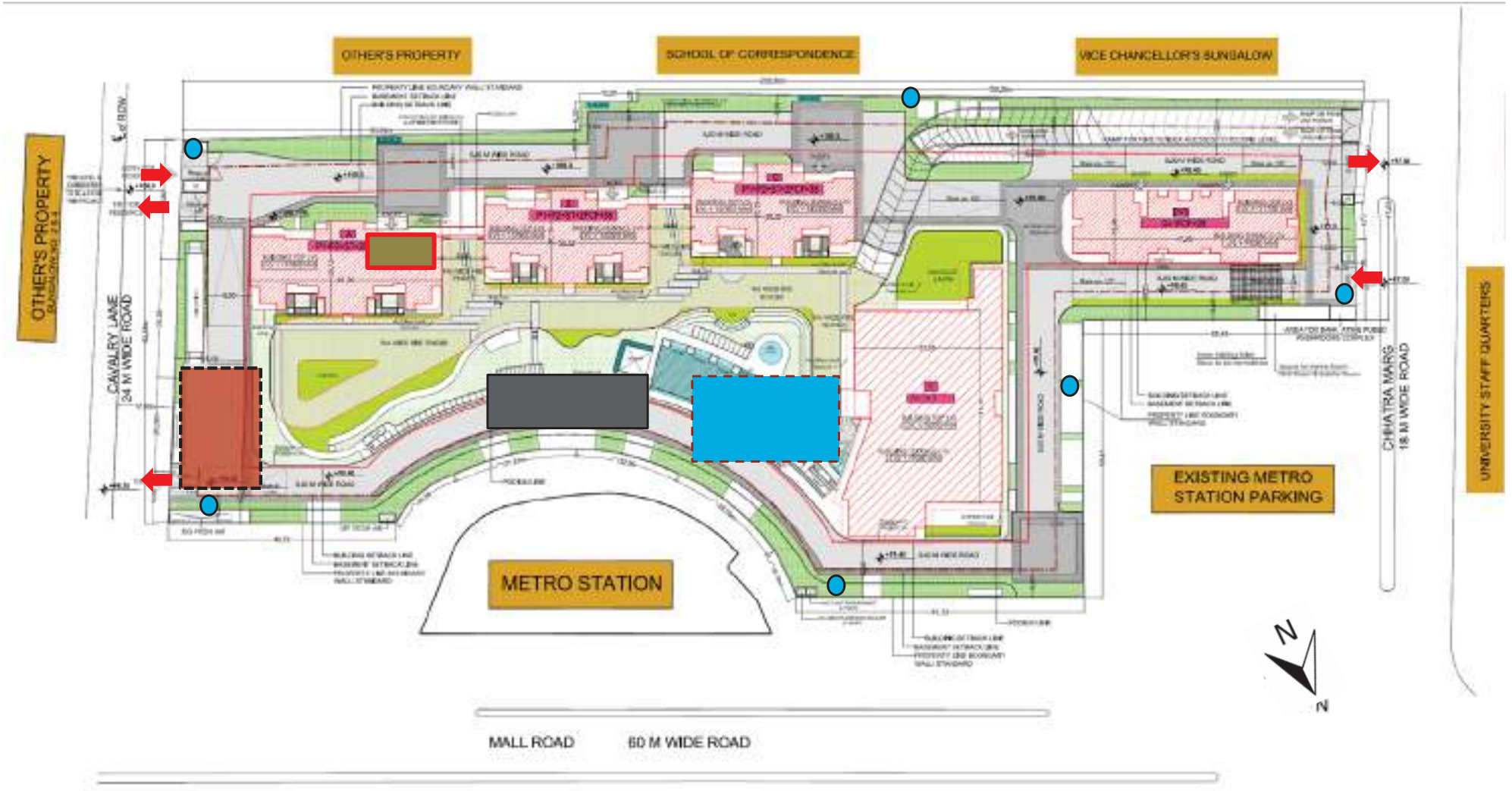


South View

SITE/CONCEPTUAL PLAN

1248

S.No	FEATURES	LEGENDS
1	DG SET/ESS	
2	STP (210 kld)	
3	RWH PITS (6)	
4	UGT	
5	OWC in Basement	



PROJECT CONCEPT PLAN

Land Utilization Details			
Plot Area	20000	4.94 Acre	
Permissible Ground Coverage	6660	Sqm	33.30%
Ground Coverage Achieved	2943.8	Sqm	14.70%
Minimum green area	3340	Sqm	
Green Area Provided			
Green Area on Ground (Soft Green 15%)	3005	Sqm	
Green Area on Basement (2.23%)	446	Sqm	
Green Area on Podium (13.31%)	2662	Sqm	
Total Green Area Provided (30.6%)	6113	Sqm	
Swimming Pool Area (on surface - open)	269.91	Sqm	
Road area	6571.29	Sqm	
Open Area	4102	Sqm	
Max height of tallest building(terrace level).	145.3	m	

Construction Details	
Number of Main Residential Building Blocks	3
Number of EWS Block	1
Community Facility Block	1

Main Residential Block Details	
Tower A	
Type	4 BHK
DU per floor	2
Number Dwelling Units	74
Podium	2
Stilt	1
Fire Check Floor	2
Typical Floors	36
Pent house floors	2
Total Number of Floors	43

PROJECT SALIENT FEATURES (CONTD.)

Tower B	
Type	3 BHK
DU per floor	2
Number Dwelling Units	74
Podium	2
Stilt	1
Fire Check Floor	2
Typical Floors	36
Pent house floors	2
Total Number of Floors	43
Tower C	
Type	3 BHK
DU per floor	2
Number Dwelling Units	74
Podium	2
Stilt	1
Fire Check Floor	2
Typical Floors	36
Pent house floors	2
Total Number of Floors	43
EWS Block Details	
Type	1 BHK
DU per floor	8
Number Dwelling Units	224
Ground Floor (Shops)	1
Number of shops in Ground Floor	16
Fire Check Floor	1
Typical Floors	28
Total Number of Floors	30
Community Facility Block	
Community Facility	
Number of Floors	2 lvl above podium

PROJECT SALIENT FEATURES (CONTD.)

FAR/Built up Area Details		
Permissible FAR (Main FAR)	200	
Achieved FAR (Main FAR)	199.99	
Permissible FAR Area (Main FAR)	40000 (Main Block) + 500 (Community)	Sqm
Achieved FAR Area (Main FAR)		
FAR achieved Tower A	14770.04	Sqm
FAR achieved Tower B	12009.36	Sqm
FAR achieved Tower C	12009.36	Sqm
FAR achieved Community Building	1709.12	Sqm
Total FAR achieved in main block	**40497.88**	Sqm
EWS FAR Requirement (Minimum)	15 % of Main FAR	
EWS FAR Provided	23.70 % of main FAR	
EWS FAR Area Requirement (Minimum)	6000	Sqm
EWS FAR Provided	9478.24	Sqm
Total FAR Area (Main + EWS) provided	**49976.12**	Sqm
Non-FAR Areas		
Non-FAR Areas (other than basements/ podium & stilt)	39957.82	Sqm
Ground and First Floor Podium Area	16081.2	Sqm
Second Floor Stilt Area	1382.59	Sqm
Basement 1	14794.21	Sqm
Basement 2	15687.7	Sqm
Total Basement Area (Basement 1 + Basement 2)	**30481.91**	Sqm
TOTAL NON FAR AREA	**87903.52**	**Sqm**
TOTAL BUILT UP AREA	**137879.64**	**Sqm**

POPULATION DETAILS

Population Projection	
Population Rate	
As per NBC 2016	
Residential Population for 4 BHK Dus	7 persons per DUs
Residential Population for 3 BHK Dus	6 persons per Dus
Residential Population for 1 BHK Dus	4 persons per DUs
Residential Population As per NBC 2016	
Population in 4 BHK DUs (74 DUs)	518 heads
Population inf 3 BHK DUs (148 DUs)	888 heads
Population in 1 BHK DUs (224 DUs)	896 heads
Total Residential population as NBC 2016	2302 heads

WATER ENVIRONMENT



Construction water Requirement

- Estimated water requirement for construction purpose is expected to be about 275800 kl (@2 kl/built-up area) over a period of three years
- Source of construction water will be from DJB Common STP through authorized water tanker supplier

Ground Water Impact

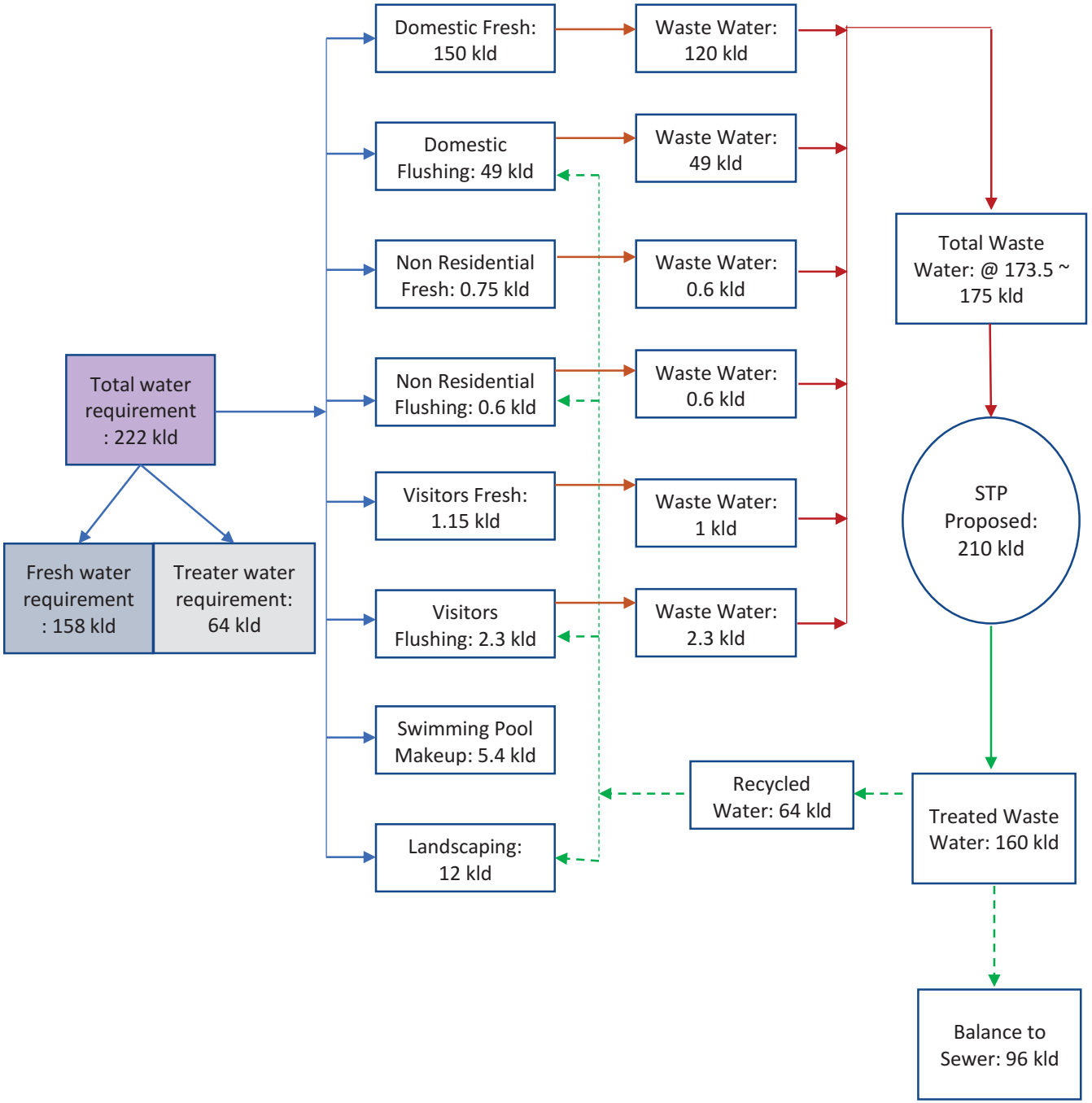
- Ground water depth at project site is 8.45 m to 10.20 m (as per soil investigation report carried out in 2018). The depth of basement is 12.45 m.
- Construction of basements below ground water table will not involve any permanent detrimental impact on the ground water regime.
- There are measures widely implemented including drainage systems etc. to prevent such backups.
- There is a natural tendency of ground water to flow from high heads to low heads
- After construction of basement the ground water will return to its original level.
- There are a number of projects in and around Delhi, being constructed below the water table.
- At least six projects (list attached) are in the vicinity of this project site and have been granted environmental clearance.
- Vishwavidyalaya Metro Station, located adjacent to the project site is an underground metro station having depth of more than this project.
- For constructing the basement below the ground water table necessary permission for dewatering will be obtained from the concerned authority as per the CGWA guidelines 2020 and as per conditions.

WATER REQUIREMENT DETAILS

WATER REQUIREMENT				
Purpose	**Population/Area**	**Rate of consumption**	**Quantity, kld**	**Source**
Residential				
Domestic	2302 heads	65 lpcd	150	Fresh (DJB supply)
Flushing	2302 heads	21 lpcd	49	Recycled Water
Non-Residential				
Domestic	30 heads	25 lpcd	0.75	Fresh (DJB supply)
Flushing	30 heads	20 lpcd	0.6	Recycled Water
Visitors				
Domestic	230 heads	5 lpcd	1.15	Fresh (DJB supply)
Flushing	230 heads	10 lpcd	2.3	Recycled Water
Swimming Pool Water Makeup	270 sqm	20 mm/sqm loss	5.4	Fresh (DJB supply)
Landscape Water requirement	6113 sqm	2 l/sqm	12	Recycled Water
Total Water Requirement			221.2~222 kld	
Total Fresh Water requirement			157.3 kld	
Total Waste water generation			173.42~175 kld	
STP proposed			MBBR with ultra-filtration	
Capacity of STP Proposed			210 kld	
Treated waste water generated			157.5~160 kld	
Treated waste water recycled (Flushing)			51.9~52 kld	
Treated Waste water recycled (landscaping)			12 kld	
Total treated waste water recycled			64 kld	
Balance water disposed in public sewer			96 kld	

Head	Source	Quantity
Fresh Water Requirement	Delhi Jal Board (DJB)	**158 kld**
Treated Water Requirement	On site STP treated water	**64 kld**

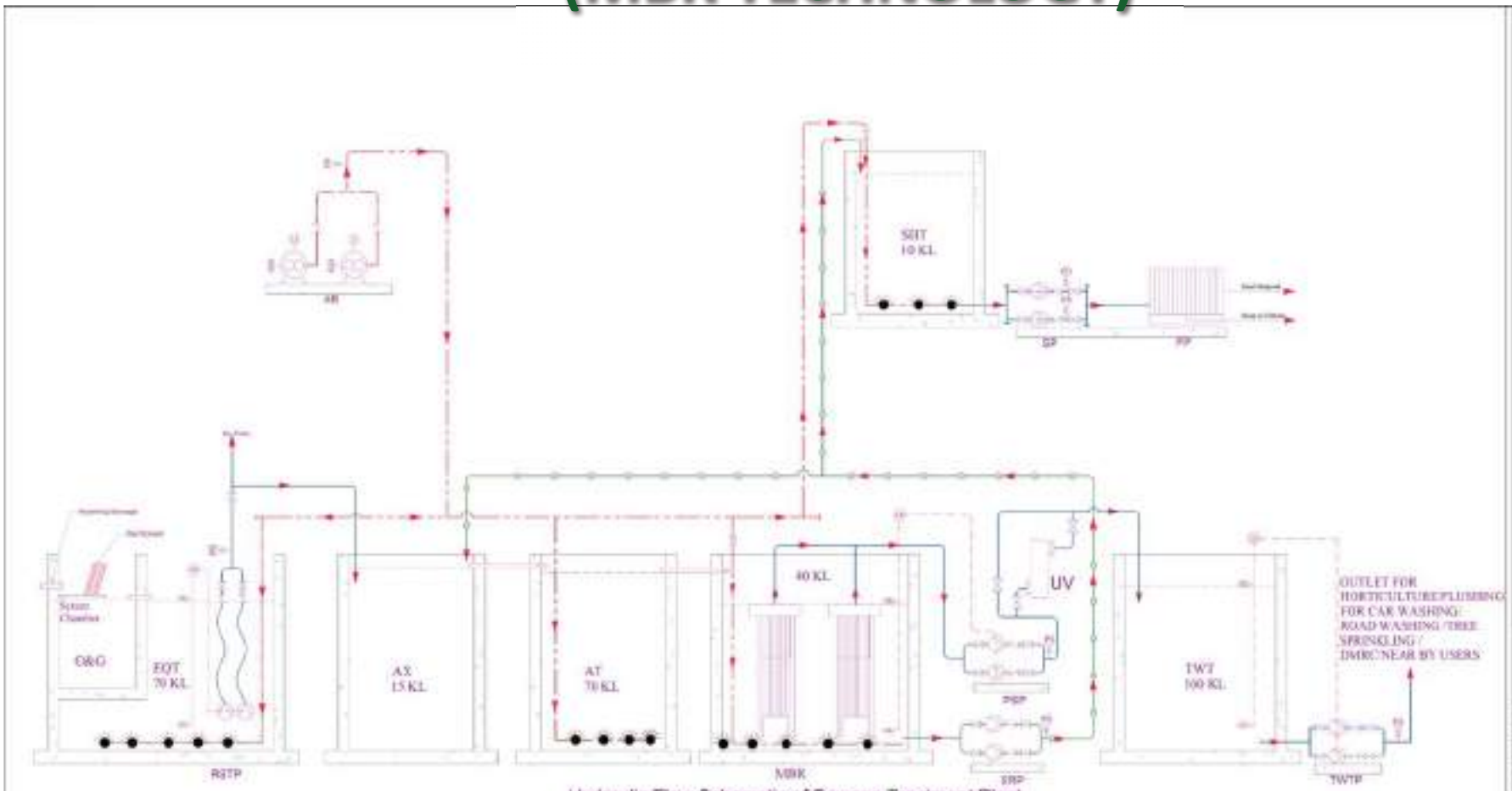
WATER BALANCE DIAGRAM



WASTE WATER MANAGEMENT PLAN

- Estimated waste water Generation: 173.5 ~ 175 kld
- Total Treated water available: 160 kld. Treated water recycle - 64 kld and remaining 96 kld unused treated waste water will be disposed in public sewer. *(Treated waste water from STP will be used for watering road side plantations, dust suppression, watering in DDA parks etc. on demand in consultation with DDA/ PWD/ Forest Department)*
- Proposed STP (Capacity): 210 kld
- Proposed treatment methodology : MBR
- Treatment up to tertiary level.
- STP shall have power back-up for uninterrupted operation during power failure.
- Treated waste water will be used for Flushing & Gardening

STP FLOW DIAGRAM (MBR TECHNOLOGY)



Hydraulic Flow Schematic of Sewage Treatment Plant
MBR Based

Legend	
Mark	Description
	Air Line
	Sludge Line
	Effluent Line
	Water Level
	Butterfly Valve
	Non Return Valve
	Pressure Gauge
	Pump
	Air Blower
	Ball Valve
	High Level
	Low Level
	Level switch

List Of Electromechanical Unit		
Mark	Description	Unit
RSTP	Raw Sewage Transfer Pump	2 No's
TWTP	Treated Water Transfer Pump	2 No's
PSP	Permeate Suction Pump	2 No's
SP	Screw Pump	2 No's
FP	Filter Press	1 No
AB	Air Blower	2 No's
U V	Ultra Violet System	1 No
SRP	Sludge Recycling Pump	2 No's

List Of Civil Unit	
Mark	Description
SC	Screen Chamber
O&G	Oil & Grease Trap
EQT	Equalization Tank
AX	Anoxic Tank
AT	Aeration Tank
MBR	Membrane Bio Reactor
TWT	Treated Water Tank
SHT	Sludge Holding Tank



RAIN WATER HARVESTING

RAIN WATER HARVESTING CALCULATION

Particulars	Terrace area	Road/ Paved area	Green area
Area (Sq.m.)	6700	7146	6116
Runoff coefficient	0.9	0.75	0.3
Peak Hour Rainfall (m)	0.06	0.06	0.06
Volume of one hour Rainfall (m^3)	361.8	321.5	110
15 Minutes Volume (m^3)	90.45	80.4	28
Total Volume of Rain Water for Recharge (m^3)	198.8		
Volume of one storage pit (m^3)	(3.5 m x 2 m x 5 m) = 35 (m^3)		
Number of recharge pits required	5.68		
Number of recharge pits provided	6		

GREEN AREA DEVELOPMENT



GREEN AREA DEVELOPMENT PLAN

- Total 6113 **m^2 i.e. 30.6 % of green area** (Soft Green 15%, 2.23% on basement and 13.31%on Podium) will be developed under landscaping, which will enhance the beauty of the site and help to reduce air and noise pollution.
- Green Area required as per building bye-law is 3340 sqm

Type of Green Area	Proposed Green Area (m^2)	% of Plot Area
Green area on ground (soft green)	3005	15%
Green area on basement (hard green)	446	2.23%
Green area on podium (hard green)	2662	13.31%
Total Green area	6113	30.6%

Botanical Name	Common Name	Numbers to be planted
Azadirachta indica	Neem	12
Anthocephalus cadamba	Kadamb	11
Polyalthia longifolia	Ashoka	38
Tebebuia impetiginosa	Pink Trumpet Tr.	2
Schleichera oleosa	Kosam	15
Plumeria alba	Safed Champa	22
Plumeria rubra	Champa	4
Ficus benjamina	Weeping Fig	99
Erythina variegate	Indian Coral Tree	19
Bauhinia variegate	Kachnar	8
Phoenix dactilyfera	Date Palm	25
Wodyetia bifurcata	Fox Tail Palm	13
Total		**268**

LANDSCAPE PLAN



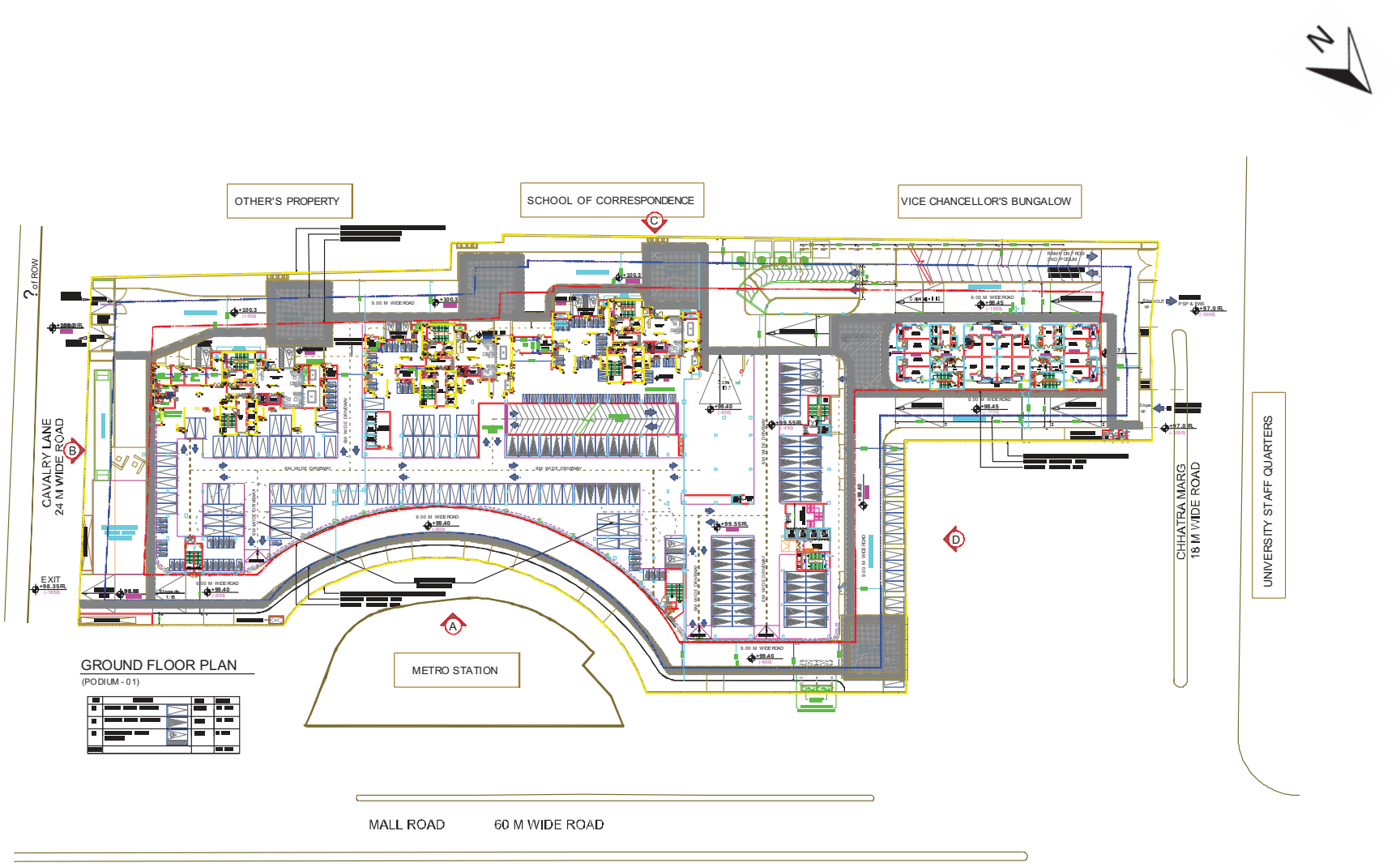
PARKING AND CIRCULATION



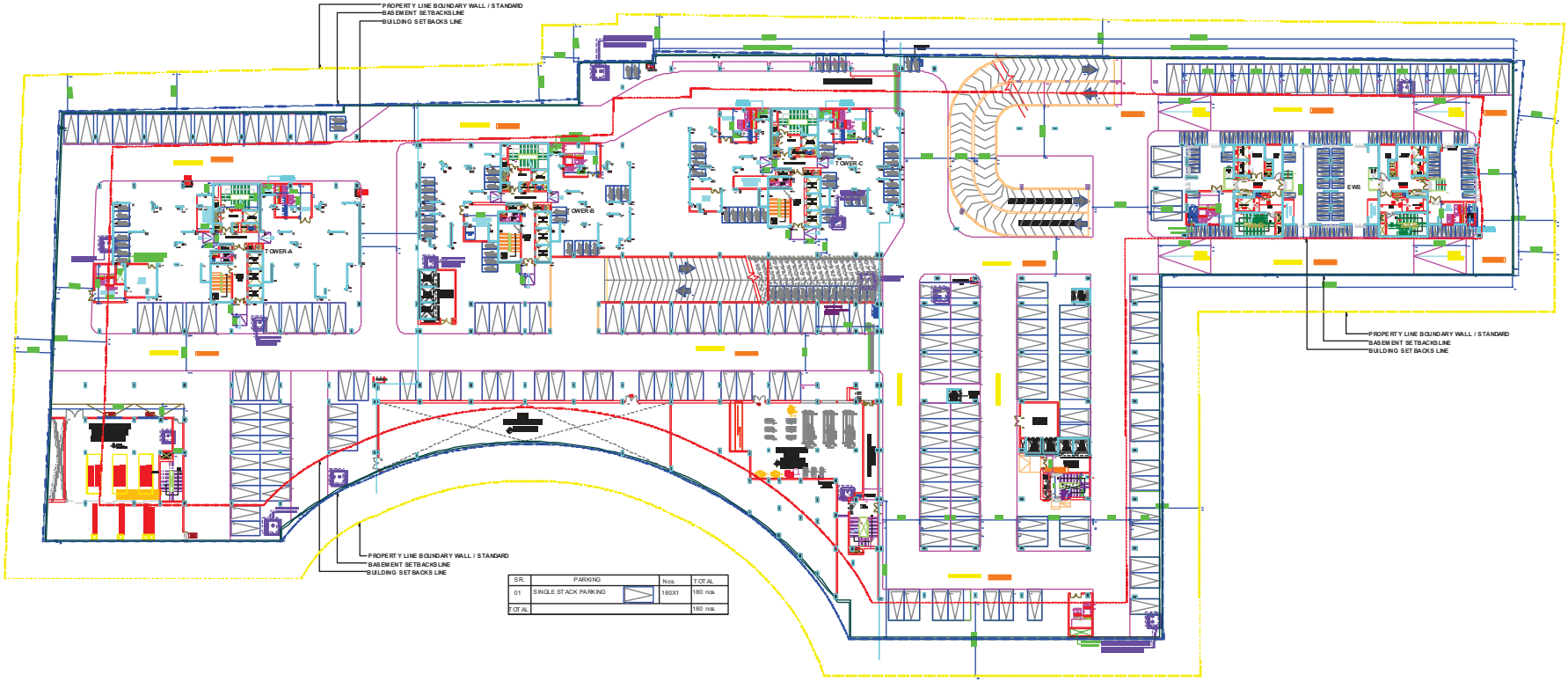
PARKING CALCULATION

Parking Details		
Parking required		
Parking required Main Building	2	ECS/100 sqm FAR
Parking required for EWS	0.5	ECS/100 sqm FAR
Parking required Main Building	810	ECS
Parking required for EWS	48	ECS
Total Parking Required	858	ECS
Parking provided		
Podium 1 (Single car parks)	101	ECS
Podium 1 (Stack car parks)	124	ECS
Podium 1 (Accessible car parks)	10	ECS
Podium 2 (Single car parks)	56	ECS
Podium 2 (Stack car parks)	190	ECS
Stilt above podium 2 (Stack car parks)	12	ECS
Upper Basement (Single car parks)	174	ECS
Upper Basement (Accessible car parks)	13	ECS
Lower Basement (Single car parks)	180	ECS
Total Parking provided	860	ECS

GROUND FLOOR PARKING PLAN (PODIUM PARKING)

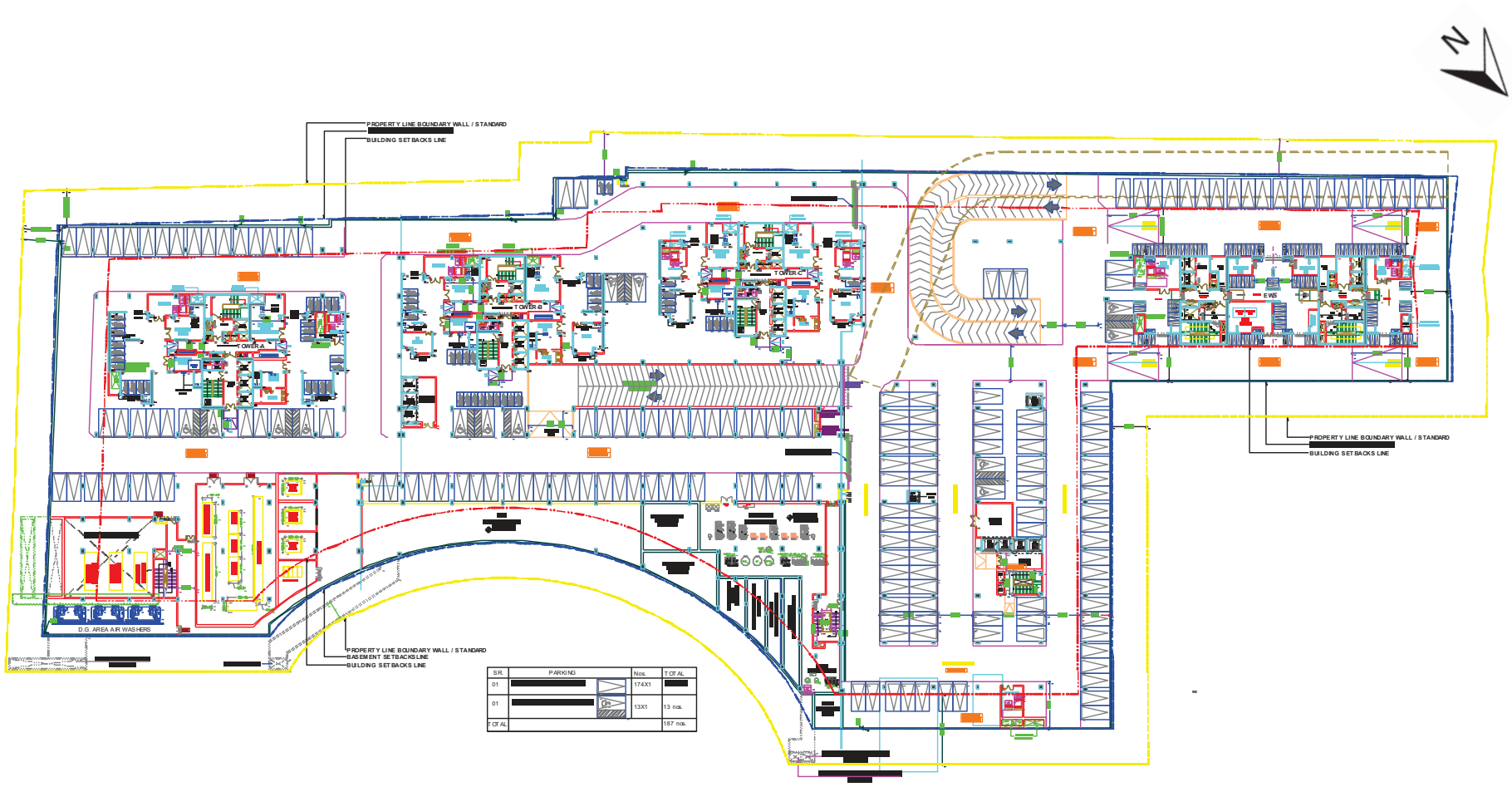


LOWER BASEMENT PARKING PLAN



SR.	PARKING	Nos.	TOTAL
01	SINGLE STACK PARKING	180X1	180 nos.
TOTAL			180 nos.

UPPER BASEMENT PARKING PLAN





SOLID WASTE MANAGEMENT

SOLID WASTE MANAGEMENT

Construction Waste Management

- Construction waste expected to be generated from the project during three years of construction period is about 6900 T. The construction waste will be disposed in the C&D waste management facility. Currently C&D waste management facility are located in Burari, Jahangirpuri, East Kidwai Nagar and Shastri Park in Delhi.

Solid Waste Management

- Proposed project will generate about **1.40 TPD** wastes including approx. **0.85 TPD** biodegradable wastes.
- Provision of Organic Waste Converter for treatment of biodegradable wastes.
- Recyclable waste shall be handed over to authorized agency.
- Door to door to collection of garbage would be provided.
- Transportation and disposal of inert and non salable waste through local authority to common municipal waste disposal site on regular basis

Hazardous Waste Management

- It shall be maintained as per Hazardous Waste Management & Handling Rule 2016.
- Used oil/spent oil from DG will be recycled through pollution control board authorized vendor.
- There should not be any ignition source near the storage room.

E- Waste Management

- E-waste will be collected and stored in separate storage area and will be handed over to authorized vendor of CPCB/ MOEF&CC as per E-waste management & handling rules 2016.

SOLID WASTE MANAGEMENT

Waste Category	Quantity	Unit
Total Waste Generation	1.40	TPD
Organic Waste Generation	0.85	TPD
Non-biodegradable: 0.55 TPD	0.55	TPD

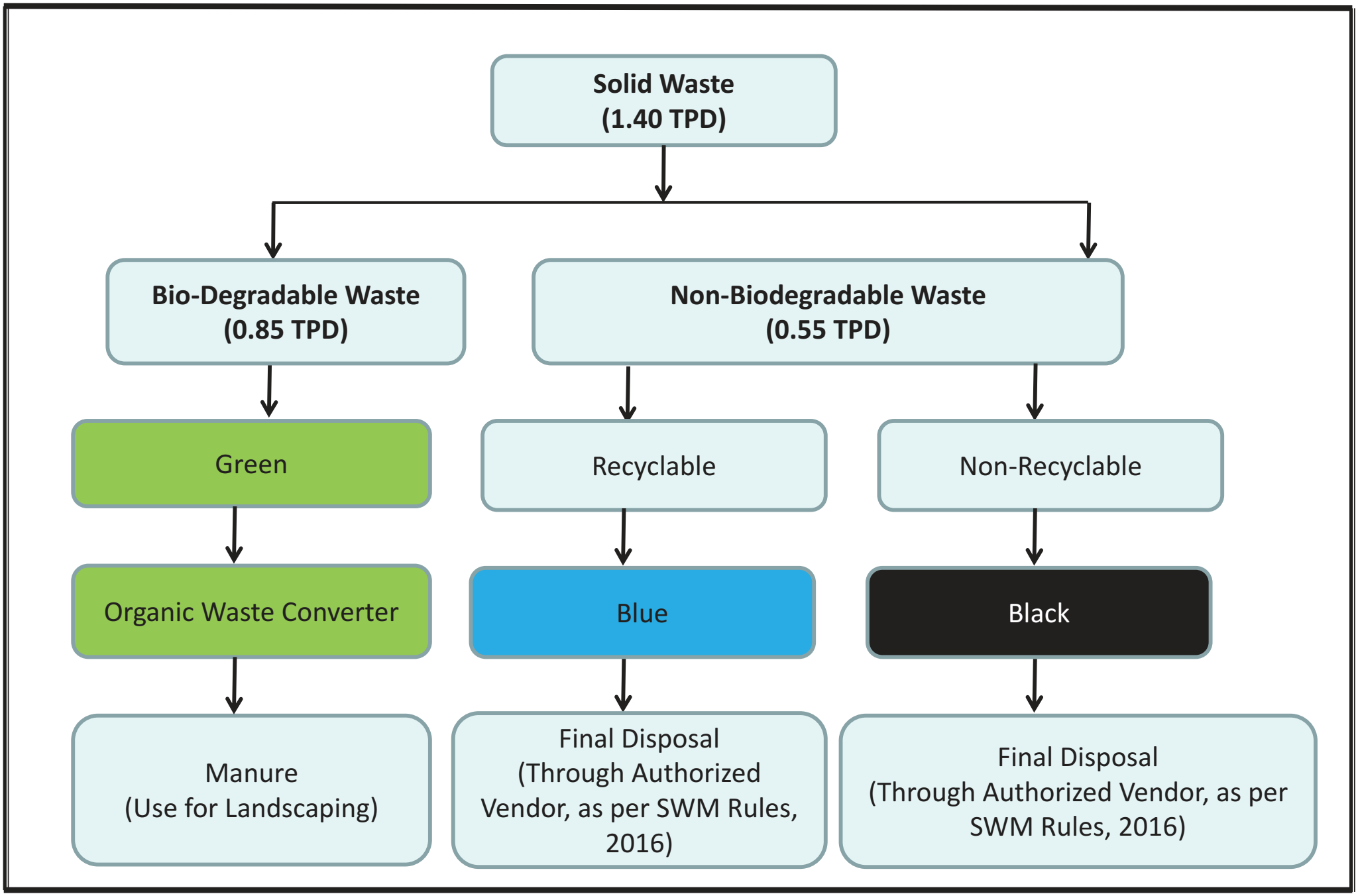
1. **Solid waste:** Biodegradable waste will be disposed off through on-site OWC and used as manure in landscaping area whereas non-biodegradable waste will be further segregated into recyclable and non recyclable waste and handed over to authorized recyclers for further process as per SWM Rules, 2016

2. **Hazardous waste:** Used oil will be disposed off through authorized recyclers a per Hazardous Waste Management Rules, 2016.

3. **E- Waste:** Will be separately stored in an exclusive area and disposed off through authorized recyclers.

4. **Construction Waste:** Excavated soil, concrete waste, brick bats will be used on site as filler material for covering open spaces such as internal roads and pavements remaining construction waste if any will be sent to an approved dumping site.

SOLID WASTE MANAGEMENT PLAN- (OPERATIONAL PHASE) 1273



BIODEGRADABLE WASTE MANAGEMENT-OWC

Biodegradable Waste Management

The segregated biodegradable waste will be composted in Organic Waste Converter and will be used as manure for landscaping.

Process:

SEGREGATED BIODEGRADABLE WASTE

↓

ORGANIC WASTE CONVERTER

↓

CRUSHING & HOMOGENIZATION
(5 MIN)

↓

COMPOSTING (TWO WEEKS)

↓

GARDEN/LANDSCAPING
APPLICATION



DG SETS & POWER BACKUP

- Power load: approx. **2791 KW.**
- Source of Power Supply: Tata Power Delhi Distribution Limited (TPDDL).
- Power Backup:
  - DG sets having capacity of **3000 kVA (02x1500)** would be provided.
  - One additional DG having capacity 1500 kVA will be kept as standby.
  - Suitable acoustic enclosure of DG sets as per EP rules.
  - Ultra Low Sulphur Diesel will be used in D.G. sets.
  - Height of D.G Stack – As per CPCB norms (6 m above the tallest tower)

Solar Power

- Each Panel size (2x 1 Sqm) shall be generate = 300 W
- Proposed 200 No. Solar PV Panel on terrace of Towers
- Total Power generation – 300x 200 Watt = 60 kW

FIRE PROTECTION MEASURES

- Fire fighting provisions & other requirement shall be as per NBC 2016 & local fire norms.
- RCC Framed structure-CLASS-I.
- Building Envelope with 2 hrs fire rating
- Number, arrangement of staircases & its width as per fire norms- (NBC-2016).
- Stand by power supply for all fire fighting installation.
- Provision of terrace tank, pumps, fire extinguisher in each tower and on all floors
- Fire resistant and smoke check doors.
- Provision of Exit signage and Public Address System.
- Fire tender access to campus, Fire tender movement road with 9 m.
- Provision of underground tank .
- Fire Extinguishers.
- Provision of Fire Check Floors (two each in main blocks and one in EWS – as per MPD 2021 provisions)
- Fire hose reels in each floor

ECBC COMPLIANCE SUMMARY

1278

Input Parameter		Baseline	Proposed	Units
Wall material		As per ECBC	200 mm AAC Block	
Wall U-value		0.0704	0.098	Btu/hrsqft F
Roof material		As per ECBC	150mm RCC with 25 mm XPS insulation	
Roof U-value		0.0581	0.120	Btu/hrsqft F
Glazing U Value		0.528	1.004	Btu/hrsqft F
SHGC		0.27	0.8	
Window Shading		No	As per Architectural Drawings	
Cooling Sizing Ratio		1.15	1	
Heating Sizing Ratio		1.25	1	
HVAC System		Split AC	Split AC	
HVAC System Efficiency (EER)		3 Star BEE(2.8)	3 star BEE(2.8)	
Lighting Power Density	Bed Room (Building Area method)	0.88	0.88	W/ ft^2
	Common (Building Area method))	0.88	0.60	W/ ft^2
Zone Cooling set point		75	75	deg F
Zone Heating set point		70	70	deg F

Project achieves EPI ratio 0.95 when compared with ECBC baseline case. Thereby, project is meeting the ECBC compliance by 'Whole Building Performance' approach.

ECBC COMPLIANCE SUMMARY Contd….

1279

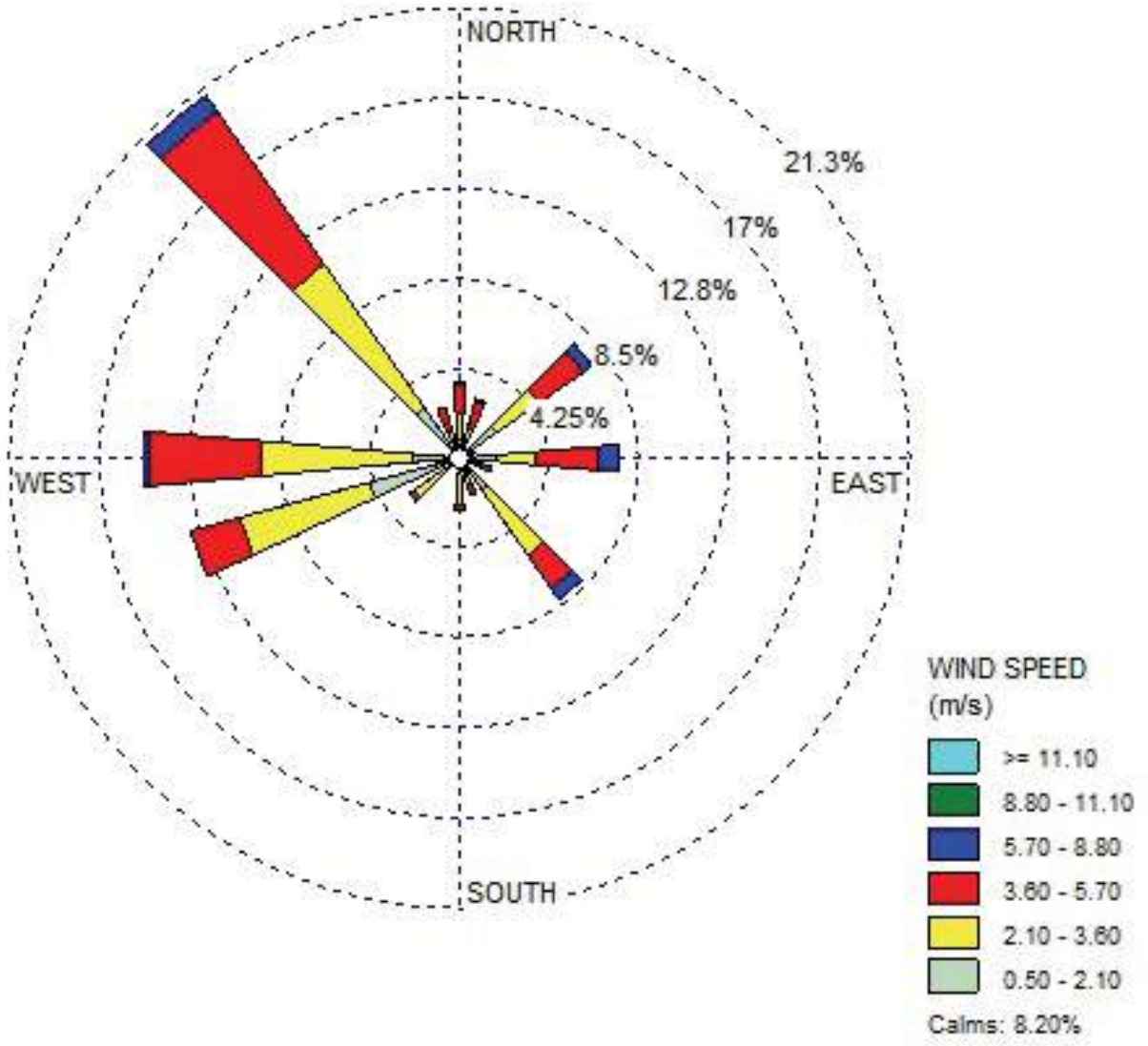
Description	Output
FAR AREA (m2)	49976.12
Proposed energy consumption (kWh per annum)	11849171
Baseline energy consumption (kWh per annum)	12402703
ENERGY SAVING ACHIEVED, kWh/ YEAR	553532
EPI Ratio Achieved	0.95



BASELINE INFORMATION

(BASELINE DATA COLLECTED IN DECEMBER 2020)

WINDROSE OF THE PROJECT SITE



MONITORING LOCATION DETAILS



Monitoring Location	
●	Air, Noise & Soil
●	Ground Water
●	Surface Water

S. No.	Code	Location	Coordinate	Distance
1.	AQ, NQ, SQ	Project site	28°41'39.79" N, 77°12'52.00" E	-
2.	GW	Shiv Mandir	28°41'37.33" N, 77°12'28.11" E	0.48 km/SW
3.	SW1	Najafgarh Drain	28°41'49.28" N, 77°12'32.59" E	0.44 km/W
4.	SW2	Yamuna River	28°42'20.85" N, 77°13'49.76" E	1.95 km/NE

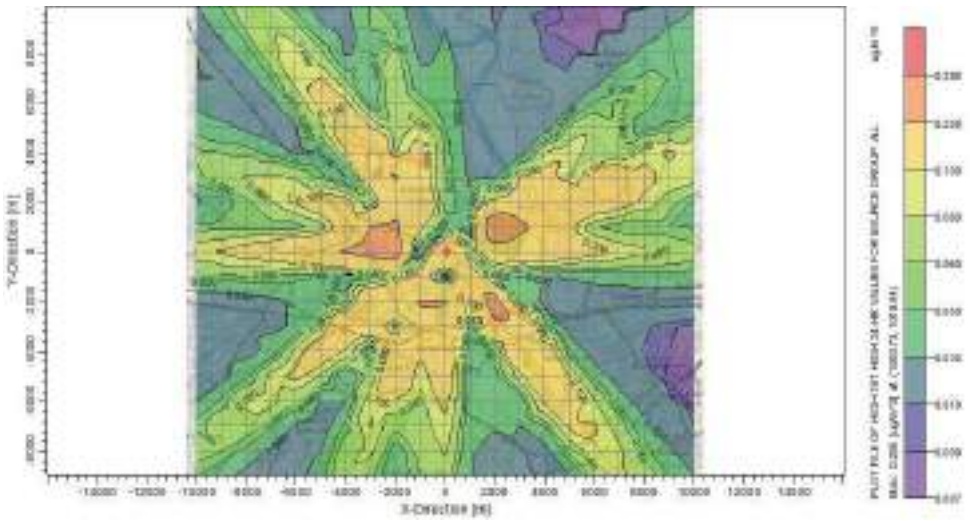
AMBIENT AIR QUALITY

S. No.	Date	Location: Project Site				
		$PM_{10}(\mu g/m^3)$	$PM_{2.5}(\mu g/m^3)$	$SO_2(\mu g/m^3)$	$NO_2(\mu g/m^3)$	CO (mg/m^3)
1	02-12-2020	312.00	167.00	9.50	24.50	1.19
2	06-12-2020	342.00	189.00	10.30	38.40	1.35
3	09-12-2020	365.00	172.00	10.90	32.80	1.18
4	13-12-2020	323.00	164.00	12.20	36.60	1.27
5	16-12-2020	201.00	108.00	9.70	27.40	1.35
6	20-12-2020	155.00	87.00	8.90	22.80	1.31
7	23-12-2020	376.00	195.00	11.60	31.60	1.36
8	27-12-2020	302.00	161.00	10.30	28.70	1.32
Minimum Value		155.00	87.00	8.90	22.80	1.18
Maximum Value		376.00	195.00	12.20	38.40	1.36
98th Percentile		374.46	194.16	12.12	38.15	1.36
Average Value		297.00	155.38	10.43	30.35	1.29

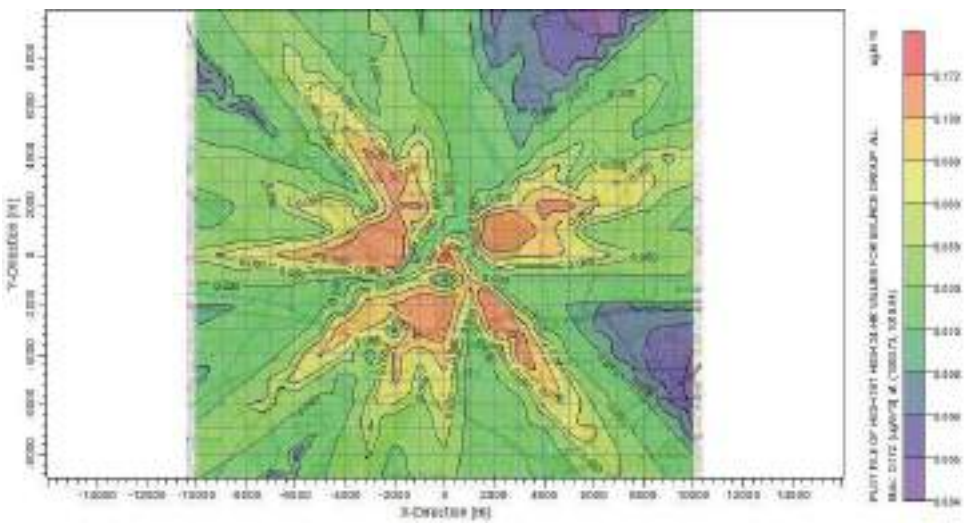
NAAQ Standards*

S.N0.	Parameters	Industrial /Residential Area	Ecologically /Sensitive Area
01.	PM_{10} (µg/m3)	100	100
02.	$PM_{2.5}$ (µg/m3)	60	60
03.	SO2 (µg/m3)	80	80
04.	NO2 (µg/m3)	80	80
05.	CO (mg/m3), 1 hourly	04	04

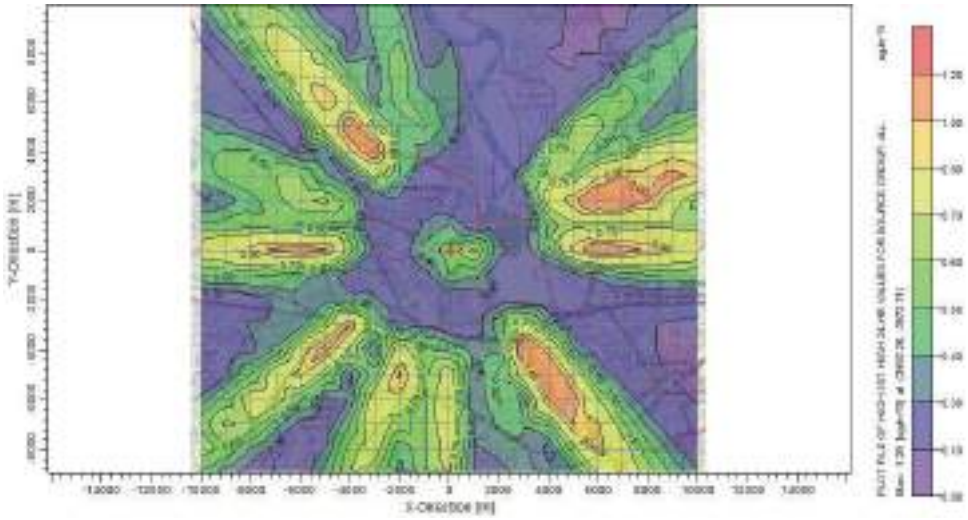
INCREMENTAL POLLUTION LOAD ON AIR QUALITY



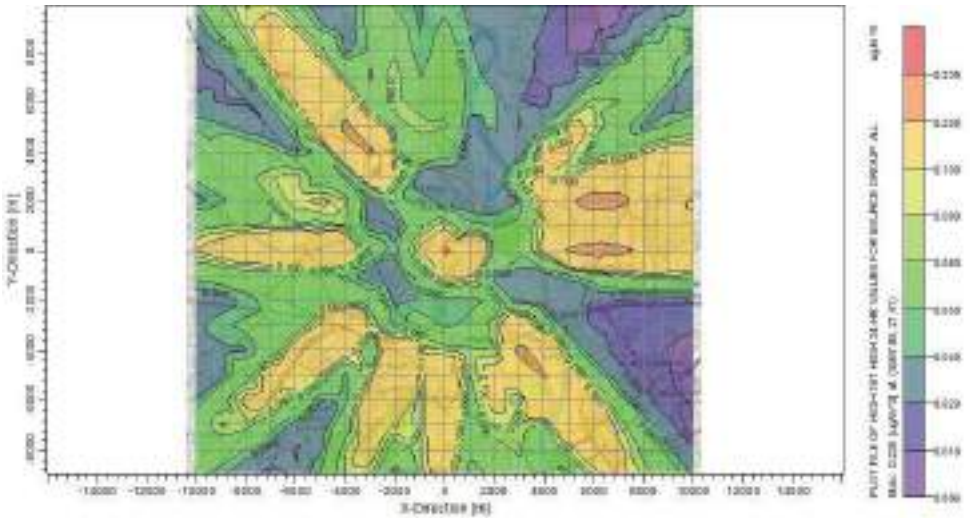
SPATIAL DISTRIBUTION OF 24-HOUR AVERAGE PM_{10} CONC. (μg/ m3)



SPATIAL DISTRIBUTION OF 24-HOUR AVERAGE $PM_{2.5}$ CONC. (μg/ m3)

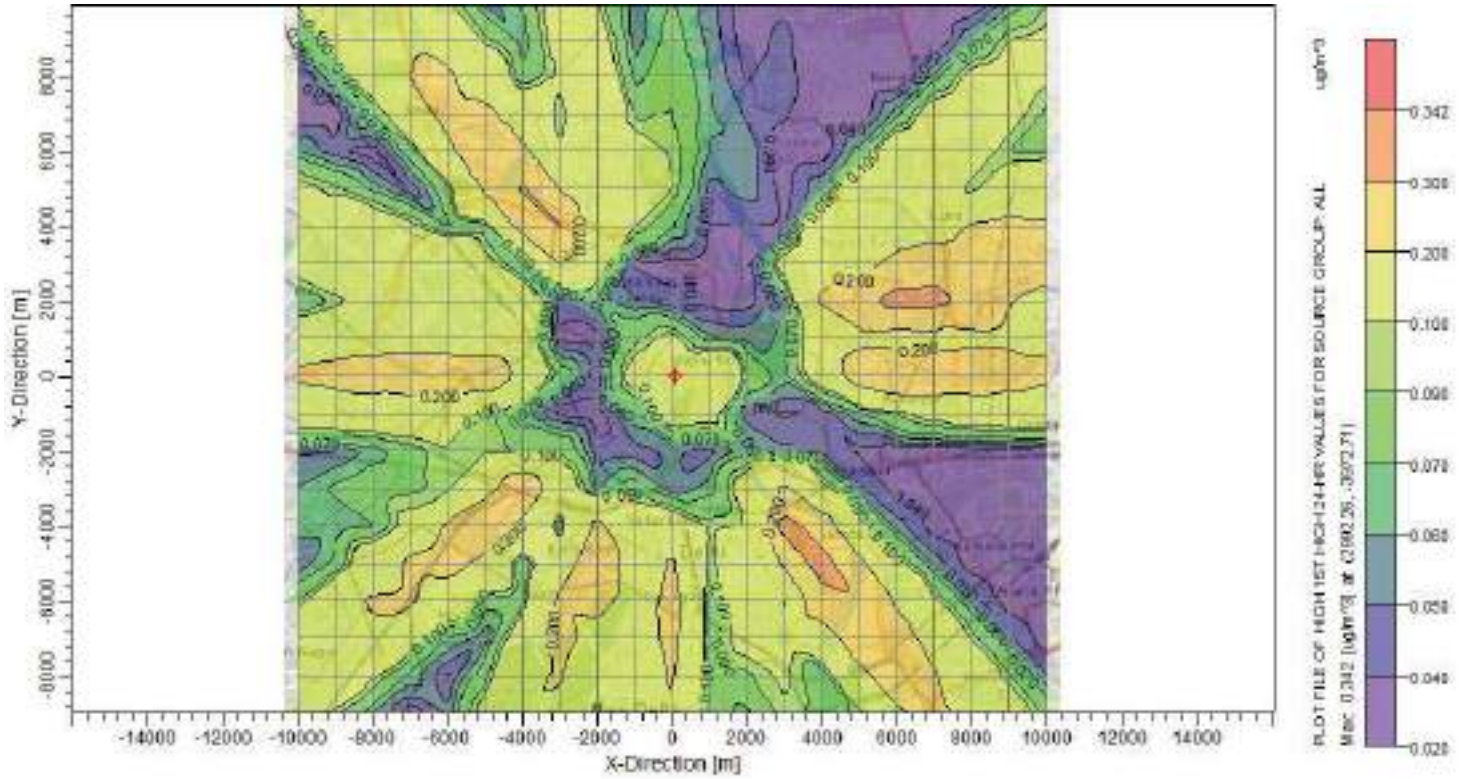


SPATIAL DISTRIBUTION OF 24-HOUR AVERAGE NO_X CONC. (μg/ m3)



SPATIAL DISTRIBUTION OF 24-HOUR AVERAGE SO_2 CONC. (μg/ m3)

MAXIMUM GROUND LEVEL CONCENTRATION



SPATIAL DISTRIBUTION OF 08-HOUR AVERAGE CO CONC. (ug/ m3)

Sr. No.	Pollutant	Unit	Background GLCs	Max. Incremental GLCs	Max. Resultant GLCs
1.	PM_{10}	$\mu g/m^3$	297	0.286	297.286
2.	$PM_{2.5}$	$\mu g/m^3$	155.38	0.172	155.552
3.	SO_2	$\mu g/m^3$	10.43	0.239	10.669
4.	NO_x	$\mu g/m^3$	30.35	1.28	31.63
5.	CO	mg/m^3	1.29	0.342	1.632

AIR QUALITY INDEX

Calculation of AQI

Pollutants		concentration in µg/m3 (except for CO)	Sub-Index	check
PM10	24-hr avg	297.00	247	1
PM2.5	24-hr avg	155.38	327	1
SO2	24-hr avg	10.43	13	1
NOx	24-hr avg	30.35	38	1
*CO (mg/m3)	max 8-hr	1.29	65	1
O3	max 8-hr	0.00	0	0
NH3	24-hr avg	0.00	0	0

Air Quality Index

AQI = **327**

* Concentrations of minimum three pollutants are required; one of them should be PM10 or PM2.5

* The check displays "1" when a non-zero value is entered

Good (0–50)	Minimal Impact	**Poor (201–300)**	Breathing discomfort to people on prolonged exposure
Satisfactory (51–100)	Minor breathing discomfort to sensitive people	**Very Poor (301–400)**	Respiratory illness to the people on prolonged exposure
Moderate (101–200)	Breathing discomfort to the people with lung, heart disease, children and older adults	**Severe (>401)**	Respiratory effects even on healthy people

NOISE LEVEL

Time (Hrs)	Leq. day Time
	ANQ1- (Project Site)
06:00 - 07:00 AM	44.5
07:00 - 08:00 AM	48.5
08:00 - 09:00 AM	54.3
09:00 - 10:00 AM	54.9
10:00 - 11:00 AM	55.4
11:00 - 12:00 PM	54.3
12:00 - 13:00 PM	54.7
13:00 - 14:00 PM	54.2
14:00 - 15:00 PM	55.7
15:00 - 16:00 PM	54.2
16:00 - 17:00 PM	54.6
17:00 - 18:00 PM	54.3
18:00 - 19:00 PM	53.7
19:00 - 20:00 PM	49.6
20:00 - 21:00 PM	47.5
21:00 - 22:00 PM	43.3
Lday	**52.11**

Time (Hrs)	
	ANQ1- (Project Site)
22:00 - 23:00 PM	42.6
23:00 - 24:00 PM	41.7
24:00 - 01:00 AM	40.6
01:00 - 02:00 AM	40.3
02:00 - 03:00 AM	39.7
03:00 - 04:00 AM	39.9
04:00 - 05:00 AM	41.6
05:00 - 06:00 AM	43.7
Lnight	**41.26**

CPCB Limits		
	Day Time	**Night Time**
Industrial area	75	70
Commercial area	65	55
Residential area	55	45
Silence Zone	50	40

GROUND WATER MONITORING RESULTS

1288

Water collected from Shiv Mandir, (28°41'37.33" N, 77°12'28.11" E)

S No.	Parameter	Test Protocol	Results	Unit	Requirements as per IS 10500- 2012	
					Acceptable limits(Max)	Permissible limits(Max)
1.	pH	IS 3025 P-11 1983	8.31	--	6.5-8.5	No Relaxation
2.	Turbidity	IS 3025 P-10 (1984)	<0.5	NTU	1	5
3.	Total Hardness	IS 3025 P-21 (2009)	464.0	mg/l	200	600
4.	Total Dissolved Solids (TDS)	IS 3025 P-16(1984)	1256.0	mg/l	500	2000
5.	Calcium as Ca	IS 3025 P-40 (1991)	86.4	mg/l	75	200
6.	Magnesium as Mg	IS 3025 P-46 (1994)	60.26	mg/l	30	100
7.	Total Alkalinity as $CaCO_3$	IS 3025 P-23 (1986)	508.0	mg/l	200	600
8.	Chloride as Cl	IS 3025 P-32 (1988)	326.0	mg/l	250	1000
9.	Barium as Ba	Annex F of IS:13428	<0.05	mg/l	0.7	No Relaxation
10.	Ammonia as N	IS 3025 P-34 (1988)	<0.1	mg/l	0.5	No Relaxation
11.	Sulphate as SO_4	IS 3025 P-24 (1986)	92.0	mg/l	200	400
12.	Nitrate as NO_3	IS 3025 P-34 (1988)	30.5	mg/l	45	No Relaxation
13.	Fluoride as F	APHA,22nd Edition	0.27	mg/l	1	1.5
14.	Iron as Fe	IS 3025 P-53 (2003)	0.16	mg/l	1.0	No Relaxation
15.	Aluminium as Al	IS 3025 P-55(2003)	<0.01	mg/l	0.03	0.2
16.	Anionic Detergent	Annex K of IS:13428	<0.05	mg/l	0.2	1
17.	Phenolic Compounds	IS 3025 P-43 (1992)	<0.001	mg/l	0.001	0.002
18.	Boron as B	IS 3025 P-57 (2005)	<0.1	mg/l	0.5	2.4
19.	Chromium as Cr	IS 3025 P-52 (2003)	<0.01	mg/l	0.05	No Relaxation
20.	Lead as Pb	IS 3025 P47 (1994)	<0.01	mg/l	0.01	No Relaxation
21.	Copper as Cu	IS 3025 P42 (1992)	<0.01	mg/l	0.05	1.5
22.	Mercury as Hg	IS 3025 P-48 (1994)	<0.001	mg/l	0.001	No Relaxation
23.	Manganese as Mn	IS 3025 P-59 (2006)	<0.01	mg/l	0.1	0.3
24.	Zinc as Zn	IS 3025 P-49 (1994)	<0.01	mg/l	5	15
25.	Arsenic as As	IS 3025 P-37 (1988)	<0.01	mg/l	0.01	No Relaxation
26.	Nickel as Ni	IS 3025 P-54 (2003)	<0.01	mg/l	0.02	No Relaxation
27.	Cadmium as Cd	IS 3025 P-41 (1992)	<0.001	mg/l	0.003	No Relaxation

SURFACE WATER QUALITY MONITORING RESULTS

1289

Surface Water collected from Najafgarh Drain (SW1) (28°41'49.28" N, 77°12'32.59" E), Yamuna River (SW2) (28°42'20.85" N, 77°13'49.76" E)

S.NO.	Parameter	Test Method	RESULTS		Units
			SW_1	SW_2	
1.	pH	IS 3025 P-11 1983	7.68	6.61	-
2.	Conductivity	IS 3025 P-14 1984	732.0	361.0	µs/cm
3.	Turbidity	IS 3025 P-10 (1984)	95.0	48.0	NTU
4.	Free Residual Chlorine	IS 3025 P-26 (1986)	<0.1	<0.1	mg/l
5.	Total Hardness	IS 3025 P-21 (2009)	184.0	156.0	mg/l
6.	Total Dissolved Solids (TDS)	IS 3025 P-16(1984)	464.0	228.0	mg/l
7.	Calcium as Ca	IS 3025 P-40 (1991)	30.4	26.0	mg/l
8.	Magnesium as Mg	IS 3025 P-46 (1994)	26.24	22.35	mg/l
9.	Total Alkalinity as $CaCO_3$	IS 3025 P-23 (1986)	208.0	108.0	mg/l
10.	Chloride as Cl	IS 3025 P-32 (1988)	80.0	44.0	mg/l
11.	Barium as Ba	Annex F of IS:13428	<0.05	<0.05	mg/l
12.	Ammonia as N	IS 3025 P-34 (1988)	0.56	<0.1	mg/l
13.	Sulphate as SO_4	IS 3025 P-24 (1986)	42.0	9.0	mg/l
14.	Nitrate as NO_3	IS 3025 P-34 (1988)	34.0	1.2	mg/l
15.	Fluoride as F	APHA 4500F^-(D)	0.25	<0.1	mg/l
16.	Iron as Fe	IS 3025 P-53 (2003)	0.21	<0.1	mg/l
17.	Chemical Oxygen Demand(COD)	IS 3025 P-58 2006	136.0	28.0	mg/l
18.	Biochemical Oxygen Demand(BOD)at 27° C for 3 days	IS 3025 P-44 1993	40.0	5.2	mg/l

SURFACE WATER QUALITY MONITORING RESULTS CONTD.

19.	Dissolve Oxygen	IS 3025 P-38 1989	2.8	6.2	mg/l
20.	Aluminium as Al	IS 3025 P-55(2003)	<0.01	<0.01	mg/l
21.	Anionic Detergent	Annex K oIS:13428	<0.05	<0.05	mg/l
22.	Phenolic Compounds	IS 3025 P-43 (1992)	<0.001	<0.001	mg/l
23.	Boron as B	IS 3025 P-57 (2005)	<0.1	<0.1	mg/l
24.	Chromium as Cr	IS 3025 P-52 (2003)	<0.01	<0.01	mg/l
25.	Lead as Pb	IS 3025 P47 (1994)	<0.01	<0.01	mg/l
26.	Copper as Cu	IS 3025 P42 (1992)	<0.01	<0.01	mg/l
27.	Mercury as Hg	IS 3025 P-48 (1994)	<0.001	<0.001	mg/l
28.	Manganese as Mn	IS 3025 P-59 (2006)	<0.01	<0.01	mg/l
29.	Zinc as Zn	IS 3025 P-49 (1994)	<0.01	<0.01	mg/l
30.	Arsenic as As	IS 3025 P-37 (1988)	<0.01	<0.01	mg/l
31.	Nickel as Ni	IS 3025 P-54 (2003)	<0.01	<0.01	mg/l
32.	Cadmium as Cd	IS 3025 P-41 (1992)	<0.001	<0.001	mg/l

SURFACE WATER QUALITY MONITORING RESULTS (BIOLOGICAL PARAMETERS)

Sr. No.	Parameter	Test Method	Results		Unit
			SW1	SW2	
1.	Total coliform	IS: 1622:1981 (Reaffirmed 2014)	1600	1600	MPN*/100ml
2.	E.coli	IS: 1622:1981 (Reaffirmed 2014)	Present	Present	Present or Absent /100ml

SOIL QUALITY MONITORING RESULTS

S. No.	Parameter	Test Method	Results	Unit
1.	pH	IS 2720 P-26 (1987)	8.40	--
2.	Conductivity	IS 14767 (RA 2016)	568.0	µS/cm
3.	Moisture	IS 2720 P-25 (1972)	13.6	% by mass
4.	Water Holding Capacity	IRDH/SOP-SL/07	19.2	%
5.	Specific Gravity	IS 2720 P-3 (1980)	1.87	-
6.	Bulk density	IRDH/SOP-SL/06	1.41	gm/cc
7.	Chloride	IRDH/SOP-SL/14	356.0	mg/kg
8.	Calcium	IRDH/SOP-SL/17	1776.0	mg/kg
9.	Sodium	IRDH/SOP-SL/11	132.0	mg/kg
10.	Potassium	IRDH/SOP-SL/12	48.0	mg/kg
11.	Magnesium	IRDH/SOP-SL/16	216.0	mg/kg
12.	Organic matter	IS 2720 P-22 (1972)	0.57	% by mass
13.	Cation Exchange Capacity(CEC)	IRDH/SOP-SL/09	13.9	meq/100gm
14.	Available nitrogen	IS 14684(1999)	34.0	mg/kg
15.	Available Phosphorous	IRDH/SOP-SL/10	7.2	mg/kg
16.	Iron as Fe	IRDH/SOP-SL/22	1190.0	mg/kg
17.	Copper as Cu	IRDH/SOP-SL/21	17.2	mg/kg
18.	Zinc as Zn	IRDH/SOP-SL/20	30.5	mg/kg
19.	Texture	IRDH/SOP-SL/08		% by mass
	Sand		59.5	
	Clay		23.7	
	Silt		16.8	
20.	Sodium Absorption Ratio(SAR)	IRDH/SOP-SL/13	0.78	By calculation

Traffic

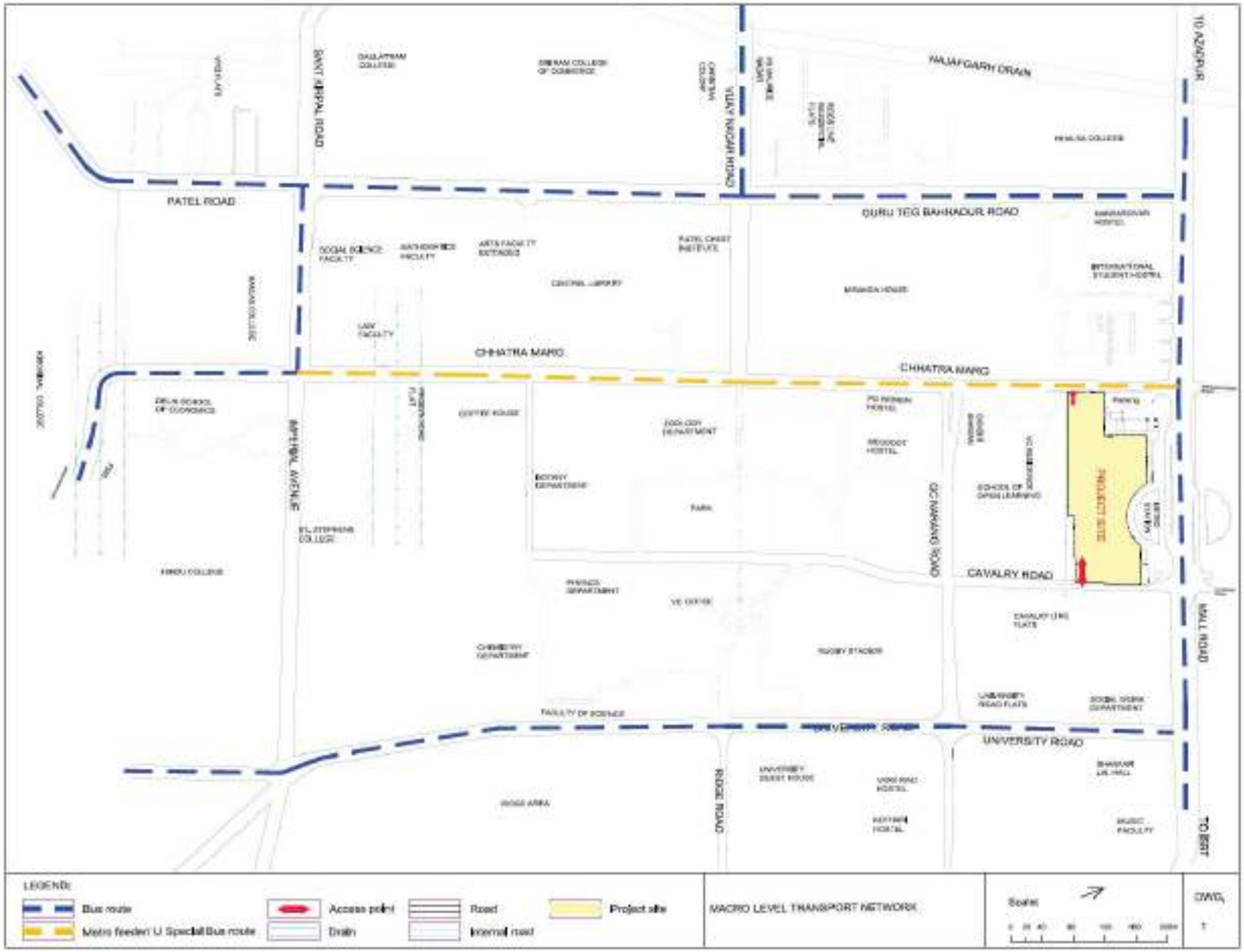
- Traffic Management plan based on data of 2018
- Cavalry Lane
  - Existing volume 423 PCV/hr. V/C ratio 0.25 and level of service B.
  - With 20% growth in 2025 and 30% in 2030, the predicted VC ratio is 0.32 and 0.43 respectively with LOS remaining at B (reasonably free flowing) in 2025 and reaching C (Stable flowing) in 2030
  - No major impact is foreseen.
- Chaatra Marg
  - V/C ratio currently 0.25. LOS B. Existing Volume 1310.
  - V/C ratio expected to increase to 0.31 in 2025 and 0.33 in 2030
  - LOS to remain B (Free Flowing)

Inference of traffic study by NGT Constituted Committee

- A traffic survey was done by CPCB on October 12, 2020, accordingly the traffic impact of the NGT constituted committee inferred:
  - Volume to capacity ratio (V/C) and speed are two main parameters to assess the Level of Service (LoS), provided by the road. When the v/c ratio value equals 'one', it signifies the complete saturation of capacity of the road, resulting in congestion. Whereas, value towards '0', implies free flow condition.
  - Based on analysis, it is inferred that the inclusion of additional 615 passenger cars on the road from the project will result in marginal increase in volume to capacity ratio (ranging 0.04 to 0.16). For the various section of roads, it is also observed that increase in volume to capacity ratio during the morning peak hours (0.04-0.06) and evening peak hours (0.05-0.08) is less, as compared to the ratio during afternoon time (0.09-0.16). Overall, there will a marginal degradation in level of service.

TRAFFIC STUDY

Transportation network at macro level

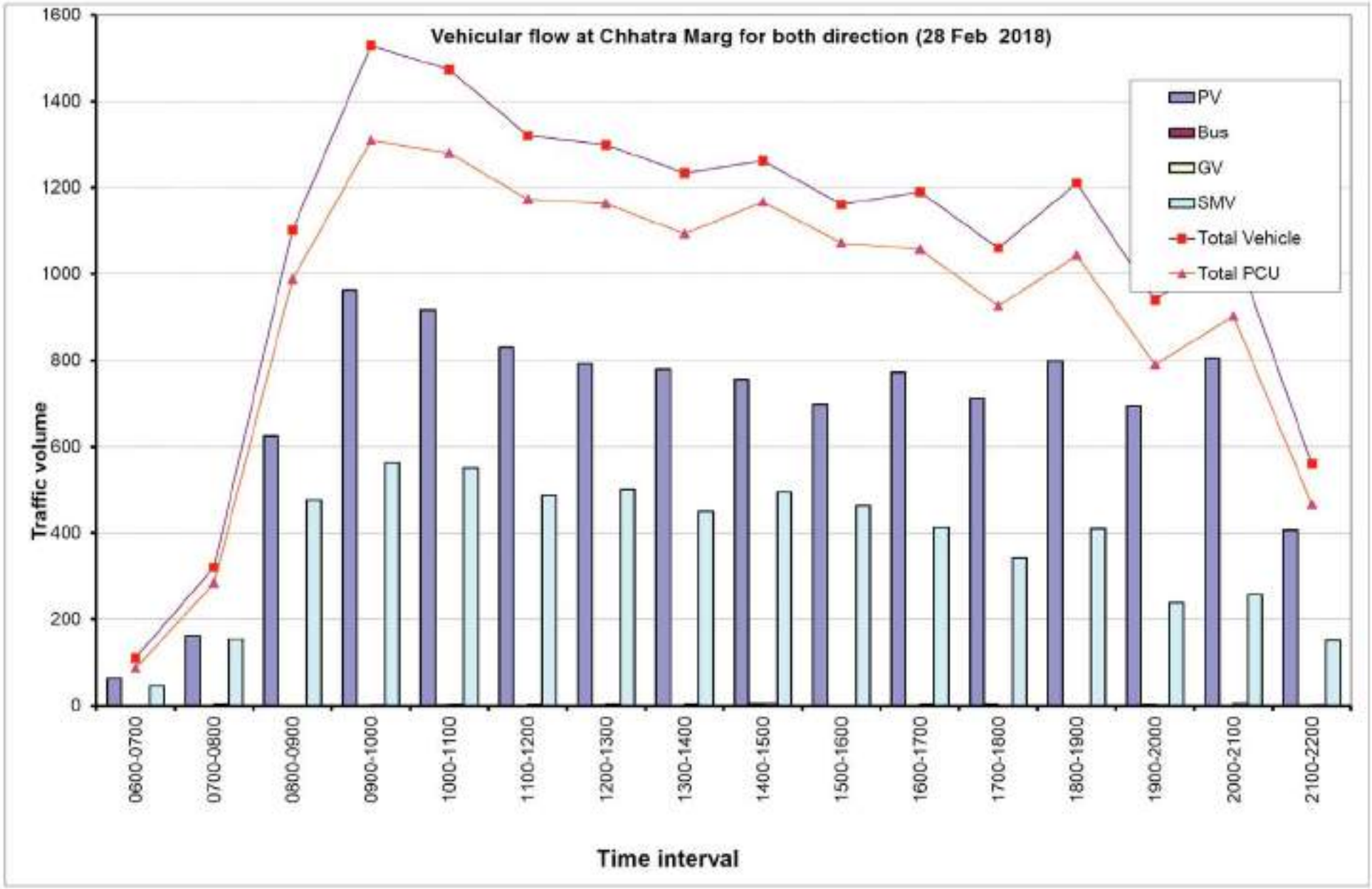


TRAFFIC STUDY

Average daily traffic volume on Chaatra marg Both Direction

HOURLY CLASSIFIED HOURLY TRAFFIC VOLUME COUNT AT MID-BLOCK																	
Time of Survey	Passenger Vehicle				Total Fast Passenger Vehicle	Buses		Total Buses	Goods Vehicles		Total Goods Vehicle	Slow Moving Vehicle			Total Slow Moving Vehicle	Total Vehicle	Total PCU's
	Two Wheeler	Auto	Car/Jeep/Van	Tata Magic		Bus	Metro Feeder Bus		LCV	Truck		Cycle	Cycle Rickshaw	E - Rickshwa			
0600-0700	37	6	21	0	64	0	0	0	0	0	0	14	3	30	47	111	87
0700-0800	66	47	49	0	162	0	0	0	4	0	4	21	10	124	155	321	285
0800-0900	255	133	236	0	624	0	0	0	1	0	1	74	99	304	477	1102	988
0900-1000	500	176	287	0	963	0	1	1	1	1	2	59	114	390	563	1529	1310
1000-1100	465	155	297	0	917	1	1	2	3	0	3	53	124	374	551	1473	1280
1100-1200	402	114	311	3	830	0	0	0	3	0	3	24	127	337	488	1321	1173
1200-1300	361	129	301	1	792	2	0	2	4	0	4	23	100	378	501	1299	1163
1300-1400	380	115	284	0	779	0	0	0	5	0	5	14	107	329	450	1234	1093
1400-1500	328	132	291	4	755	3	3	6	4	2	6	7	118	370	495	1262	1167
1500-1600	272	115	307	4	698	0	0	0	0	0	0	9	103	351	463	1161	1072
1600-1700	350	91	330	1	772	1	0	1	4	0	4	11	87	315	413	1190	1057
1700-1800	325	115	272	0	712	0	4	4	1	0	1	16	68	259	343	1060	926
1800-1900	370	130	299	0	799	0	0	0	1	0	1	33	68	309	410	1210	1043
1900-2000	333	97	264	1	695	3	0	3	0	2	2	11	26	202	239	939	790
2000-2100	366	83	356	0	805	0	0	0	4	2	6	23	44	191	258	1069	903
2100-2200	189	30	187	0	406	0	0	0	2	0	2	20	19	113	152	560	466
Total	4999	1668	4092	14	10773	10	9	19	37	7	44	412	1217	4376	6005	16641	14801

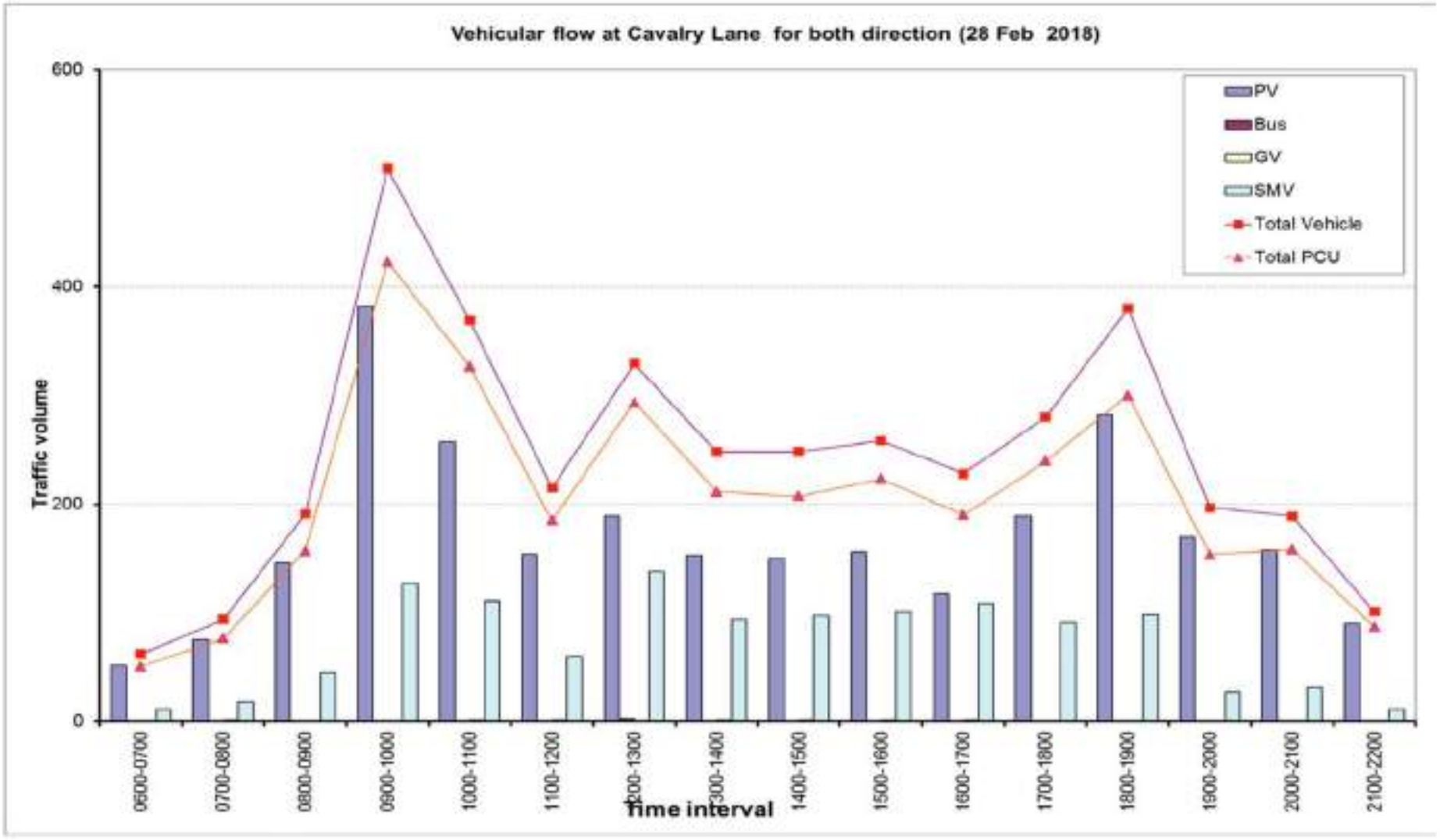
Hourly Variation of Traffic Volume on Chhatra Marg Both Direction



TRAFFIC STUDY

Hourly mid block count at Cavalry Marg (Delhi University to Mall Road - 28/02/2018) BOTH DIRECTIONS																
Time of Survey	Passenger Vehicle				Total Fast Passenger Vehicle	Buses		Total Buses	Goods Vehicles		Total Goods Vehicle	Slow Moving Vehicle			Total Slow Moving Vehicle	Total Vehicle	Total PCU's
	Two Wheeler	Auto	Car/Jeep/ Van	Tata Magic		Bus	Metro Feeder Bus		LCV	Truck		Cycle	Cycle Rickshaw	E - Rickshwa			
0600-0700	20	17	14	0	51	0	0	0	0	0	0	3	0	8	11	62	51
0700-0800	27	25	23	0	75	0	0	0	1	0	1	9	0	9	18	94	77
0800-0900	52	59	35	0	146	0	0	0	0	0	0	17	1	27	45	191	157
0900-1000	139	146	97	0	382	0	0	0	0	0	0	37	4	86	127	509	423
1000-1100	79	94	84	0	257	0	0	0	1	0	1	16	9	86	111	369	327
1100-1200	58	43	53	0	154	0	0	0	1	0	1	4	1	55	60	215	185
1200-1300	76	54	59	0	189	1	1	2	0	0	0	11	11	116	138	329	294
1300-1400	65	42	46	0	153	0	0	0	1	0	1	10	1	83	94	248	212
1400-1500	69	43	38	0	150	0	0	0	1	0	1	14	1	82	97	248	208
1500-1600	49	43	64	0	156	0	0	0	1	0	1	23	2	76	101	258	224
1600-1700	58	25	35	0	118	0	0	0	1	0	1	19	1	89	109	228	191
1700-1800	79	26	84	0	189	0	0	0	0	0	0	4	2	85	91	280	240
1800-1900	133	46	103	0	282	0	0	0	0	0	0	29	2	67	98	380	300
1900-2000	85	25	60	0	170	0	0	0	0	0	0	2	1	24	27	197	154
2000-2100	65	7	86	0	158	0	0	0	0	0	0	0	4	27	31	189	159
2100-2200	33	12	45	0	90	0	0	0	0	0	0	0	5	6	11	101	87
Total	1087	707	926	0	2720	1	1	2	7	0	7	198	45	926	1169	3898	3284

Hourly Variation of Traffic Volume on Cavalry Lane Both Direction



TRAFFIC STUDY

CAVALRY LANE:

According to recent traffic survey conducted in February 2018, traffic volume on Cavalry Lane is **423** pcu during AM peak hour. The ADT is recorded to be **3284** pcu comprising of **1087** two wheeler, **707** autos, **926** cars and **2** buses on Cavalry Lane. Over a day, **7** good vehicles, 198 cycles, **45** cycle rickshaws and **926** E-Rickshaws have been noted. In the afternoon peak hour (14:00-15:00hrs, the recorded traffic volume is **208** pcu. The annexure-1 give the details of pedestrian and vehicular traffic volumes in tabular and graphic form for easy comprehension. It will be noted that the surrounding roads have adequate capacity to absorb traffic generated by the proposed development. Further the placement of access position on Cavalry Lane is not likely to cause any traffic concerns in the context.

CHHATRA MARG:

Similarly traffic survey conducted in February 2018, traffic volume on Chhatra Marg is **1310** pcu during AM peak hour. The ADT is recorded to be **14801** pcu comprising of **4999** two wheeler, **1668** autos, **4092** cars and **19** Buses.

Over a day, **44** good vehicles, **412** cycles, **1217** cycle rickshaws and **4376** E-Rickshaws have been noted. In the afternoon peak hour (14:00-15:00hrs), the recorded traffic volume is **1167** pcu. The annexure 2 give the details of pedestrian and vehicular traffic volumes in tabular and graphic form for easy comprehension.

ESTIMATE OF GENERATED TRAFFIC

It is estimated that the housing scheme will generate some 320 pcu of vehicular traffic under a peak period of four to five hour duration. Critical peak hour traffic volume is estimated at 192 pcu egress and 25 pcu/h ingress traffic volume during AM period. The flow pattern will reverse during PM peak period though the duration of PM peak period is generally longer than the AM peak period. It must be stated that considerable proportion of person trips will be made by Metro. Reliance on other modes of transport like cycle rickshaw is not expected to be high as the site offers by virtue of its location, excellent conditions for walking and nearness to the metro station. Cavalry Lane accordingly is envisaged to provide mainly the access to motorized vehicles. On adding incremental traffic to the existing traffic on Cavalry Lane, the aggregate traffic works out to be 640pcu per hour. The existing v/c ratio considering local two lane two-way carriageway configuration works out to be 0.56, and the emerging v/c ratio with project estimated to be 0.857 as per IRC 106. This v/c has built in facility of right turn traffic, parked vehicles and frontage access from the road under consideration. With v/c ratio of 0.85, congested conditions are not expected on Cavalry Lane. Further there is likely to be diversion from car to public transport especially to Metro for essential trips and this is likely to reduce the generated vehicular traffic volume from the proposed development. Walking to Metro Station for travel purposes is likely to find favour with the residential population.

TRAFFIC SYSTEM

Access System: The main approach to the site is to be drawn from Cavalry Lane would as it provides better inflow and outflow options and has the spare traffic carrying capacity.

Circulatory road: Accordingly the main access is drawn from Cavalry Lane though option to access from the west is always there in case of emergency. The on-site circulatory road is 13.5 m with 7.5m carriageway. Figures 2-4 give details of block layout and road sections.

Parking: In all 860 ECS of car parking is provided in combination of basement, podium and stilt at two levels. Basement parking egress is from two ramps. There are two separate egress ramps in the proposed configuration. During emergency all four ramps ensure quick evacuation in about 21 min and this traffic will be absorbed by access roads.

Pedestrian movement: Pedestrian and pick up and drop off facilities are provided as part of the circulatory network. Footpath along road provide for pedestrian movement.

ENVIRONMENTAL MONITORING PLAN

CONSTRUCTION PHASE				
S.N.	**Source**	**Monitoring Location**	**Parameters to be Monitored**	**Frequency**
1	Ambient Air Quality	Project Site (Near main Gate)	PM_{10},$PM_{2.5}$, SO_2, NO_2 and CO	Half yearly (2 samples/year) excluding monsoon season
2	Water Quality	Bore Well (Nearby available)	Drinking water parameter as per IS10500-2012	Half yearly (2 samples/year) for entire construction period
3	Noise Level	Project Site (Near main Gate)	Equivalent noise level	Half yearly (2 samples/year) for entire construction period
4	Soil	Project site	As per standards	Half yearly (2 samples/year) for entire construction period

OPERATIONAL PHASE				
S. N.	**Source**	**Monitoring Location**	**Parameters to be Monitored**	**Frequency**
1	Ambient Air Quality	Within the project site	PM_{10},$PM_{2.5}$, SO_2, NO_2 and CO	Half yearly (2 samples/year) excluding monsoon season
2	Waste Water Quality	STP	Parameters as per CPCB/SPCB Standard	Monthly (Continuous)
3	Ambient Noise	Near Main Entrance Gate	Equivalent noise level	Half yearly (2 samples/year) for per years
4	Soil	Project site	As per standards	Half yearly (2 samples/year) at project site.
5	DG Stack			
6	DG Noise	Near DG sets	As per CPCB standard	Half yearly (2 samples/year)



ANTICIPATED ENVIRONMENTAL IMPACTS & ENVIRONMENTAL MANAGEMENT PLAN

Impacts	Mitigation Measures
Construction Phase	
▪ Impact due to construction of basement,	▪ Due to construction of basement, the quantity of earth excavation is expected to be 190000 cum. The excess earth will be disposed-off through competent vendor.
Operational Phase	
▪ Disturbance of the soil in the project site may result in soil erosion	▪ The non-built up areas will be covered with grass turfing.

Impacts	Mitigation Measures
Construction Phase	
Deterioration of air quality due to fugitive dust and gaseous emission and transportation of material .	▪ Covering of stored construction materials. ▪ Dust suppression by water sprinkling. ▪ PUC certified of construction equipment & vehicles. ▪ Barricading around construction area. ▪ Wind breaker of appropriate height will be provided around project construction site. ▪ Provision of wheel washing. ▪ Wet jet will be used in grinding and stone cutting. ▪ Trucks carrying construction materials & debris being covered ▪ Tarpaulin scaffolding around the area of construction & the building for effective and efficient control of dust emission.
Operation Phase	
Impacts due to operation of standby DG set	▪ Back-up DG sets to comply with the applicable emission norms and to be operated during power failure only. ▪ Adequate stack height will be provided for DG sets as per CPCB norms. ▪ Ultra Low Sulphur Diesel will be used in D.G. sets. ▪ Adequate tree plantation for air pollution control
Pollution due to traffic:	▪ The likely source of air pollution is vehicular emissions from estimated additional 669 cars on road (considering 1.5 cars/DUs on road) during occupancy phase. During assessment, it was assumed that these additional cars would be BS IV. The applicable emission limits for CO, HC and NOx were used to estimate additional pollution load. The BS IV 4 wheelers do not generate particulate matter and thus no likely addition to existing PM levels is expected.

Impacts	Mitigation Measures
Construction Phase	
Impact due to sewage generation from construction site	▪ Drinking water and on-site sanitation facilities will be provided by Project proponent. ▪ Groundwater will not be abstracted during construction. ▪ The site drainage shall be planned so that there is no accumulation of waste water within the project area or in the vicinity of the site. ▪ Mobile toilets will be provided. ▪ Efficient curing will reduce the demand of water.
Construction water requirement	▪ Construction water requirement for the project is estimated to be about 280 million litre @ 2kl/sqm BUA. Construction water will be procured by tanker supply through DJB authorized supplier or by water obtained after dewatering if allowed by the competent authority.
Dewatering during construction of basement	▪ Construction of basements will lead to excavation up to a depth of 12.45 m below ground level. Dewatering will be required for additional 1 m from the depth of foundation, which is up to a depth of 13.45 m BGL.
Operational Phase	
Source : Municipal Water Supply	▪ Dual Flushing cistern for WC is proposed for reduction of water consumption. ▪ The domestic wastewater generated will be treated in well designed Sewage treatment plant (Capacity 210 kld)

Impacts	Mitigation Measures
Construction Phase	
Increase in noise levels due to construction activities	▪ Use of protective gears by workers ▪ Proper maintenance of construction equipment & vehicles ▪ No noise generating construction activity during night hours ▪ Use of wet jet for cutting of material, or Sound proof cutting machineries ▪ There will be a marginal increase in the ambient noise due to traffic movement within the project area. The traffic movement will be only in daytime.
Operational Phase	
Impacts due to operation of DG set and traffic generated due to the project	▪ DG set will be installed with inbuilt acoustic enclosure to minimize noise. ▪ Anti vibration mount (AVM) pads will be provided to absorb the vibration on the foundation of DG set ▪ DG set foundation will be isolated from the other foundation ▪ Adequate parking, road signage and traffic management to avoid traffic congestion & noise

Impacts	Mitigation Measures
Construction Phase	
Impacts due to construction activity	▪ Construction waste expected to be generated from the project during three years of construction period is about 6900 T. The construction waste will be disposed in the C&D waste management facility. ▪ Materials like cement bags, waste papers, cardboard packing material, unusable steel in bits and pieces will be sold to recyclers. ▪ The waste generated by the 300 construction labor is expected to be about 45 kg/day. The waste will be collected in separate color coded bins (bio-degradable & non biodegradable) and will be handed over to the authorized waste management agency for disposal at the Municipal Waste Management Facility.
Operational Phase	
Impacts due to solid waste disposal	▪ The quantity of solid waste generated from the project is 1.4 TPD including biodegradable waste. ▪ Segregation of solid wastes into organic and inorganic components ▪ biodegradable waste will be treated on site OWC and will be use as manure. ▪ Selling of the recyclable inorganic wastes ▪ Stabilized and dewatered Sludge from STP will be used as manure for horticulture

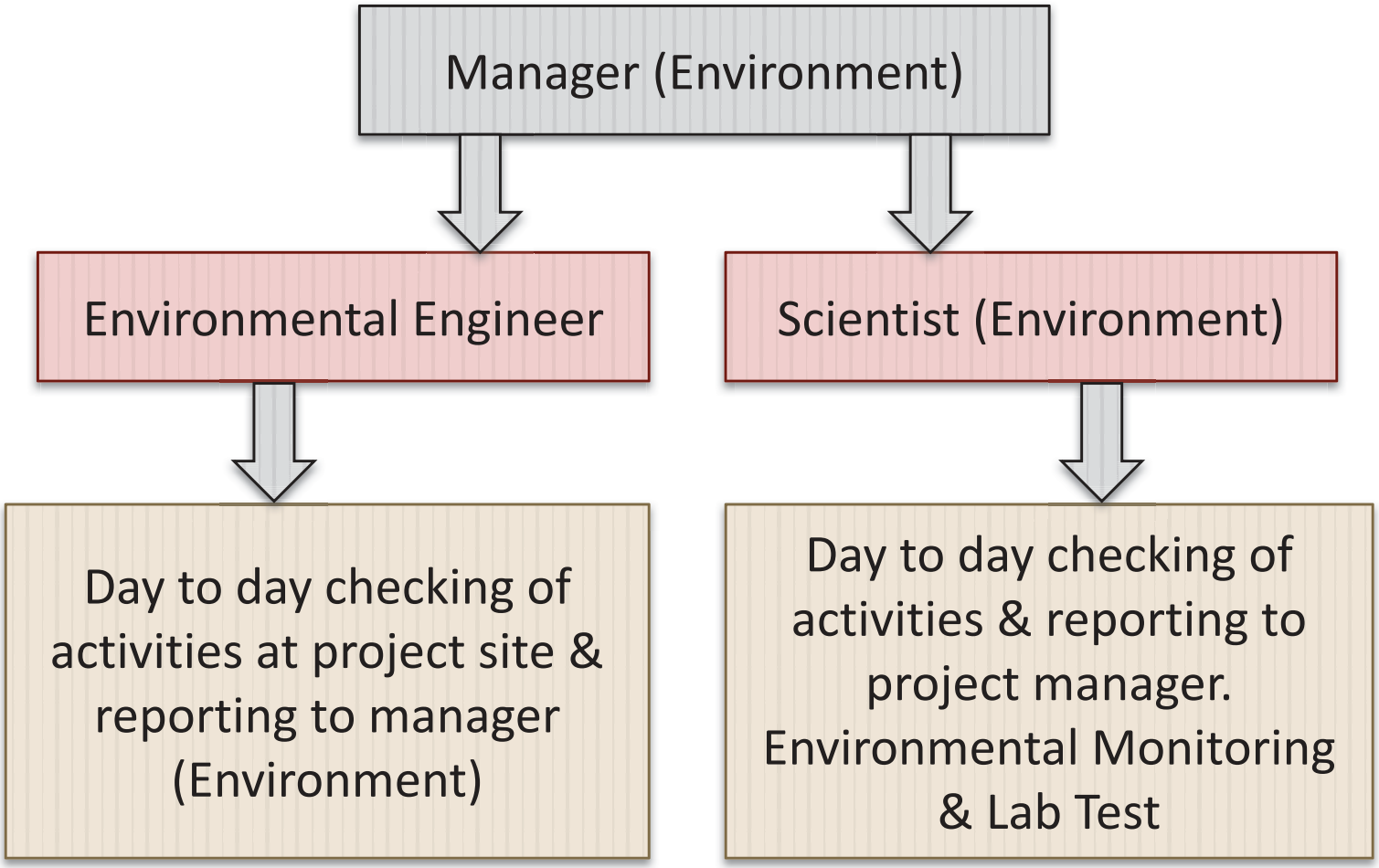
ENVIRONMENT BUDGET

Construction Phase		
COMPONENT	**CAPITAL COST (Rs in Lacs)**	**RECURRING COST (Rs in Lacs)/Annum**
BARRICADING OF CONSTRUCTION SITE	20.43	4.5
ANTI - SMOG GUN WITH COMPLETE ASSEMBLY	5	2.4
DUST MITIGATION MEASURES	1.5	0.25
SITE SANITATION	2	1
MOBILE STP	3	1
DISINFECTION/ PEST CONTROL		0.5
LABOUR HEALTH CHECK UP & FIRST AID FACILITY	1	0.5
LABOR WELFARE (canteen, creche,safe acess road - water power, cooking kerosene/gas)	2.5	1.5
WHEEL WASHING	1	0.5
WASTE STORAGE BINS - LABOUR CAMP/SITE OFFICES	1.5	0.75
TRAFFIC MANAGEMENT SIGNAGES	1.5	0.15
SAFETY TRAINING TO WORKERS		1
ENVIRONMENT MONITORING & 6 MONTHLY COMPLIANCE REPORT OF EC CONDITIONS		2
TOTAL	**39.43**	**16.05**

Operation Stage		
COMPONENT	**CAPITAL COST (Rs in Lacs)**	**RECURRING COST (Rs in Lacs)/Annum**
SEWAGE TREATMENT PLANT (210 KLD)	42	11.34
RAIN WATER HARVESTING SYSTEM (6 Nos)	21	3.15
SOLID WASTE STORAGE BINS & COMPOSTER (Organic Waste Converter 0.85 tpd)	14.45	9.54
HORTICULTURE DEVELOPMENT (TREE PLANTATION & LANDSCAPING)	3.9	0.97
ROOF TOP SPV PLANT (60 KWp)	48	0.00
ENVIRONMENT MONITORING & 6 MONTHLY COMPLIANCES OF ENVIRONMENT CLEARANCE CONDITIONS		2.00
TOTAL	**129.4**	**27.00**

ENVIRONMENT CELL

1310



THANK YOU

TATA POWER-DDL

Ref. No. TPDDL/ KCG/ 604 Date: 14th Aug'13

Young Builders(P) Ltd.
43, Babar Road, Bangali Market,
New Delhi-110001

Ref: Your Letter dated 29th July 2013

Subject: ESS approval for proposed residential development (Group Housing) at 1, 3 Cavalry Lane & 4 Chhatra Marg, Civil Lines, Delhi-9

Dear Sir,

With reference to your letter on 29th July '13 for approval of the ESS plan of Substation, we would like to inform you that required HT connection on 11 KV voltage level (3' X 3' space for RMU room) may be released, subject to feasibility of load at time application made from your site. Further the substation space as proposed by you in first basement is OK. However the final approval can be made only after site visit.

The same is earmarked in attached layout plan.

Warm Regards

Rajneesh Sabharwal
Client Manager
(Key Consumer Group)

Enclosures:

1. Layout plan of RMU and HT meter room.

DELHI JAL BOARD : (GOVT. OF NCT OF DELHI)
OFFICE OF EXECUTIVE ENGINEER (NORTH) I
O.H.T. MUKHERJEE NAGAR; DELHI-9

No:DJB/EE(N)I/2019/ 520 Dt. 9/7/19

To,
The SE (Building),
North Delhi Muncipal Corporation,

Subject:- Online building plan request ID 10065712 for approval of scheme of water in 1,3 Cavalary Lane 4 Chhatra Marg, Civil Line Delhi 110007.

Sir,

Reference plan request vide ID No. 10065712 on the subject mentioned above, the scheme of water is approved by DJB on the following terms and conditions.

1. There is shortage of water availability, therefore, water connection on completion stage will be subject to technical feasibility and availability of water at that time.
2. The assessment of water demand & IFC made by planning division and special / general conditions enclosed be followed.
3. Following Infrastructure fund charges are payable before release of plan.
   a. Infrastructure fund charges (water) :- Rs. 69,27,139.00

This issues with the approval of the Competent Authority.

EE (North) –I

Most Urgent out Today

DELHI JAL BOARD
OFFICE OF THE EX. ENGINEER (PLANNING)W-I
ROOM NO. 206 A, VARUNALAYA, PH-I,
KAROL BAGH, DELHI-05
E-Mail ID : eepw1205@gmail.com

DELHI JAL BOARD

No: DJB/EE(Plg)W-I/2019/816 **Date:-**05-07-19

To
The Executive Engineer(N)-I
Delhi Jal Board, Over Head Tank,
Mukherjee Nagar, New Delhi-110009

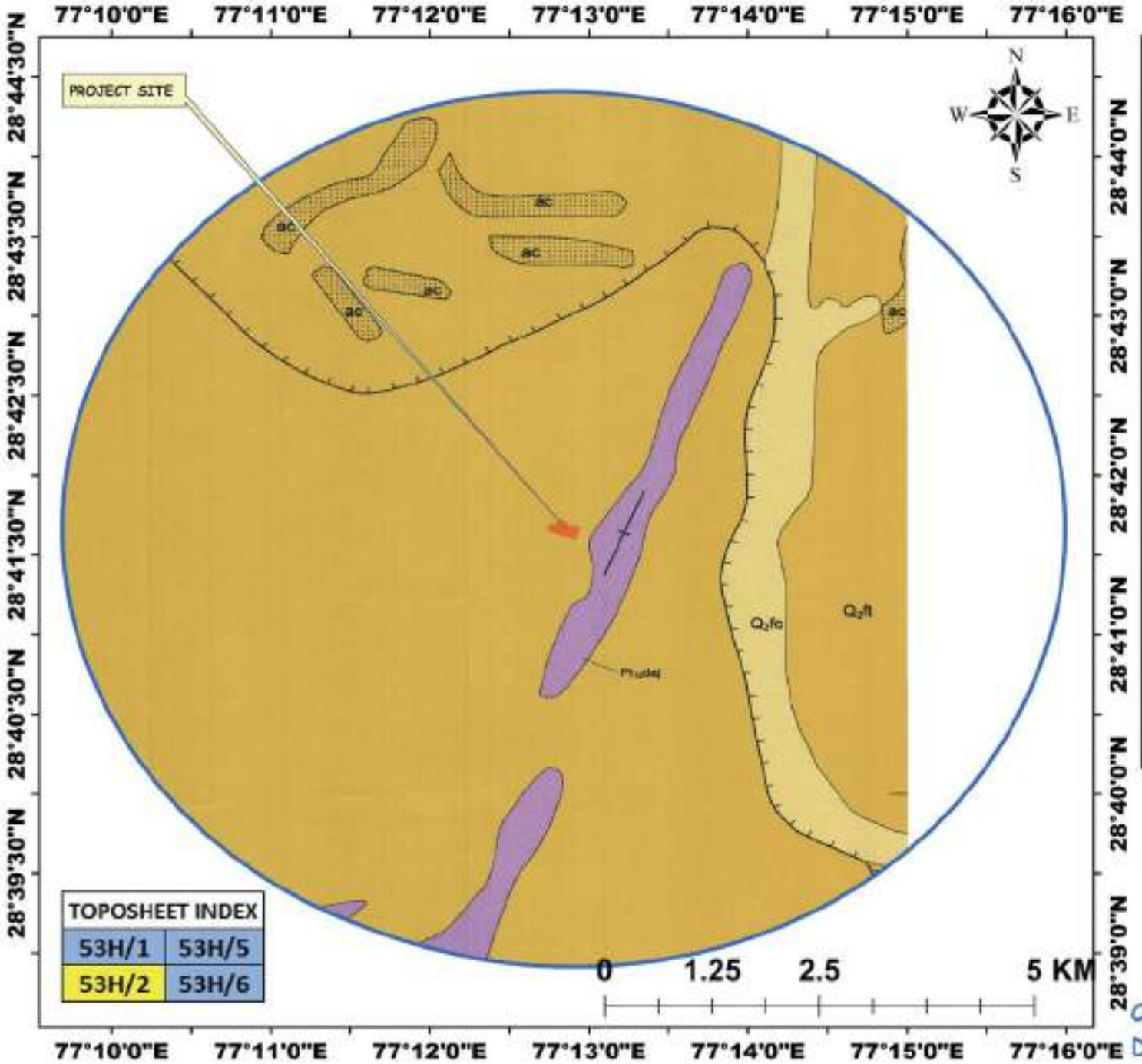
Sub:- Water demand and IFC assessment in respect of revised layout plan for group housing project at 1,3 cavalry lane and 4 chhatpra Marg near Vishvidhalaya metro station New Delhi-110007 for issue of NOC for sanction of building plans under OBPS system of SDMC/MCD.

Reference:- OBPS ID No – 10065712

Please refer to above cited subject. The total average water demand has been calculated to 4,10,460 LPD out of which the potable water demand is 3,00,170 LPD and non potable water demand is 1,10,290 LPD as per prevalent norms of DJB and capacities of storage tanks are 1,50,100 Ltr for potable water and 55,150 Ltr non potable water. Special conditions and general conditions are also enclosed. The balanced IFC for water (393390-257029= 136361@ Rs.50.80/-) amounting to Rs. 69, 27,139/- is leviable. There is an appeal vide OA No 112/2018 in Hon'ble NGT of Delhi in the matter of University of Delhi Vs UOI. The matter is subject to decision of the Hon'ble NGT of Delhi. Please take further necessary action in the matter.

EE (Plg) W-I

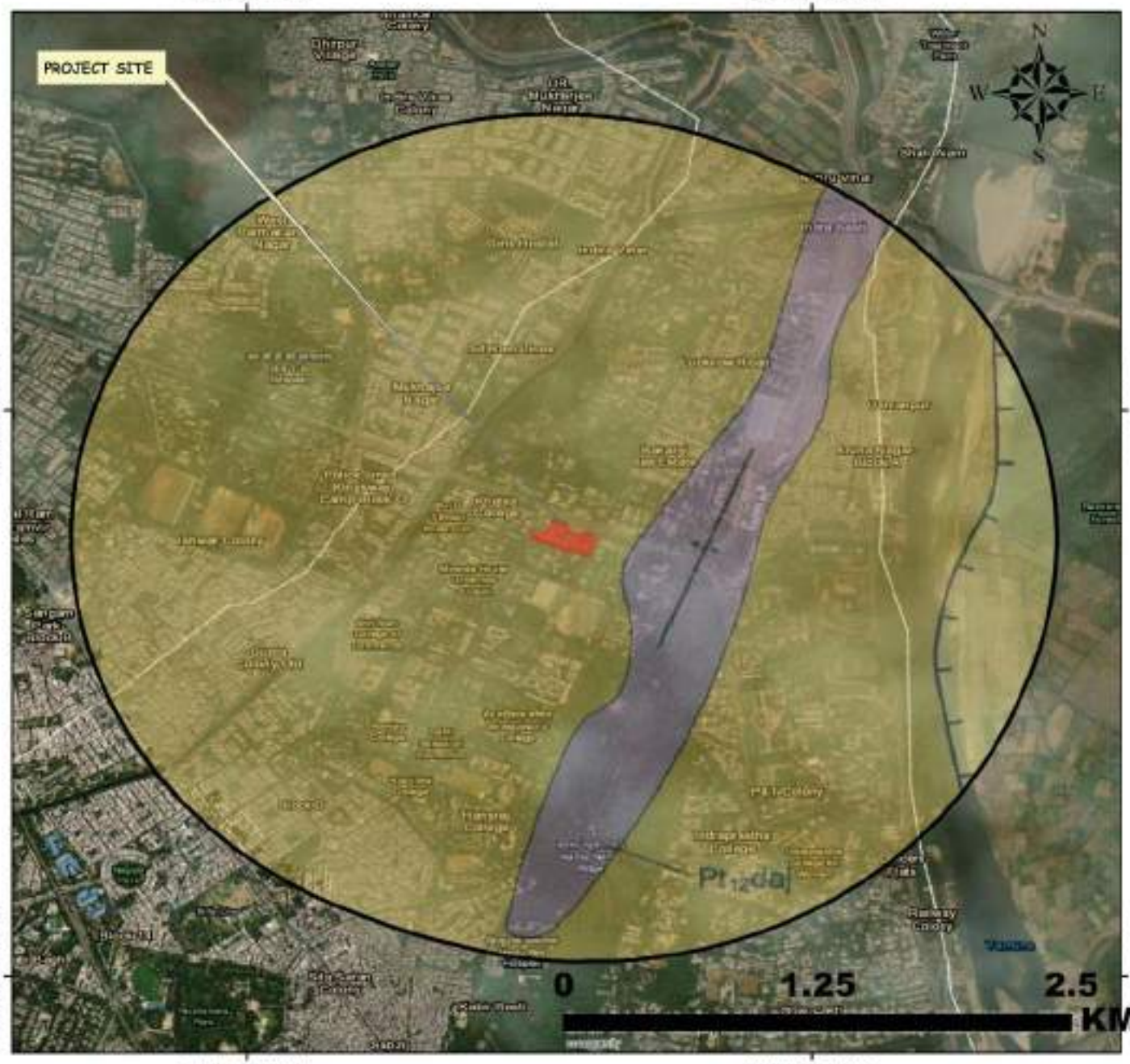
05 KM RADIUS BUFFER GEOLOGICAL /GEOMORPPHOLOGICAL MAP OF PROJECT SITE





Coordinate System: GCS WGS 1984
Datum: WGS 1984 Units: Degree

02 KM RADIUS BUFFER GEOLOGICAL / GEOMORPHCOLOGICAL MAP OVERLAIN ON GOOGLE IMAGE FROM PROJECT SITE



LEGEND

PROJECT SITE

02 KM



Coordinate System: GCS WGS 1984
Datum: WGS 1984 Units: Degree

1: 50,000 GEOLOGICAL MAP SERIES

53H/2



DELHI AND GURGAON DISTRICT, HARYANA

PRESENTATION ON ENVIRONMENT CLEARANCE 1317

FOR

PROPOSED GROUP HOUSING PROJECT AT 1,3 CAVALRY LANE & 4 CHHATRA MARG NEAR VISHWAVIDYALAYA METRO STATION NEW DELHI

BEFORE

EXPERT APPRAISAL COMMITTEE, MoEF & CC

FOR RECONSIDERATION

File No. IA3-21/15/2021-IA.III

Date: 13th April 2021

S. No. 64.4.3

Proponent :
M/s Young Builders Pvt. Ltd.
43, Babar Road, Near Bengali Market,
New Delhi - 110001

Environmental Consultant :
Ind Tech House Consult, Delhi
G-8/6, Sector-11, Rohini, Delhi-110085
QCI Sl. No. 86

NABET Accreditation Certificate No: NABET/EIA/1821/RA 0098 Valid till: 30.04.2021

INTRODUCTION

- Proposed Group Housing Project At 1,3 Cavalry Lane & 4 Chhatra Marg Near Vishwavidyalaya Metro Station New Delhi.

- The total plot area is **20,000 m^2** and built-up area will be **137879.64 m^2.**

- Maximum no of floors is 2 Basement+2 podium + 1 stilt + 2 fire check floors + 36 typical floors + 2 floor pent house (i.e. 2 basement + 41 floors.

- Total no of DU's is **222 nos.** and EWS is **224 nos.**

- Estimated cost of project is **Rs. 494.2 Cr.** (276 Crores + 218.2 land cost).

- The built up area of the project is more than 20,000 sq. m. and less than 1,50,000 sq.m. Hence the project falls under "8(a) Category Project" – Building and Construction projects as per EIA notification dated 14th September, 2006.

- In absence of SEIAA, Delhi the project has been applied to Expert Appraisal Committee for Environment Clearance.

- **Earlier the case was consider in 62nd EAC meeting dated 1st March 2021 and some observation were raised. The reply of observations was submitted on 22nd March 2021**.

PROJECT BACKGROUND

- This plot (20,000 sqm/ 2 ha) is a part of 3.05 ha land acquired by Delhi Metro Rail Corporation Ltd. (DMRC) from Ministry of Defence under an award in 2001.
- DMRC is mandated to generate resources through property development on surplus land available after construction of metro station. DMRC got the land use of 3.05 ha land changed from 'Public & Semi Public' to Residential through Delhi Development Authority vide notification dated 23.09.2005.
- DMRC advertised / issued RFP in 2008 for property development – Group Housing on the stated surplus land of 2.0 ha (20,000 sqm), invited bids and conducted auction on 28.07.2008. DMRC accepted highest bid and granted leasehold rights to M/s Young Builders Pvt. Ltd. for development of a group housing on this plot
- The project had earlier obtained environmental clearance from SEIAA - Delhi vide EC Letter No.- DPCC/SEAC/50/SEIAA/1/2012 dated 13/08/2012.
- The project had again obtained environmental clearance from the SEIAA – Delhi vide EC Letter No.- SEIAA-D/C-353/EC-350/2018 dated 23/03/2018 due to increase in FAR area of the project and revision in the project planning.
- In past, the project had been subject to a number of litigations. As per the last hearing in Hon'ble NGT, we declared that the project design has again changed and require environmental clearance. Hon'ble NGT, vide its vide appeal No. – 112/2018 and order dated 10-12-2020, suggested to apply fresh environmental clearance for this project. **At present no litigation is pending at project site.**
- **<u>No construction activity was undertaken till date apart from the site barricading</u>**

POINT WISE REPLY OF OBSERVATIONS

S. No. 1. Clarification for the proposal of 2 basements with reference to recommendation of the committee constituted by NGT and Supreme Court Order.

Reply. To achieve the permissible FAR and Parking in the proposed group Housing project, there is a provision of 2 Basement. There is no restrictions in National Building Code or in the guidelines of the Ministry of Urban affairs.

S. No. 2. Analyse the discrepancies and resubmit the conceptual plan after making the necessary revisions. Water balance flowchart needs to be revised.

Reply. Corrections have been made in the conceptual plan stated that excess treated waste water will be reused first, in case it is not reused in nearby area, then not more than 96 kld, will be discharged into public sewer.

S. No. 3 Air pollution management in the context of Graded Action Plan for Delhi & NCR.

Reply. Reply has been submitted and attached.

S. No. 4. Point wise replies to the representation made by Delhi University

Reply. Point wise reply has been submitted and attached.

THANK YOU

YOUNG BUILDERS PRIVATE LIMITED
Regd Off : 43, Babar Road, Bengali Market, New Delhi 110 001, India
T. +91 11 4235 5235, 4235 5200 F. +91 11 4235 5250
E: delhi@mdoverseas.com, CIN: U70101DL1981PTC012508

August 02, 2021

ANNEXURE-R24

(ENQUIRY COUNTER)
DELHI POLLUTION CONTROL COMMITTEE
DEPARTMENT OF ENVIRONMENT
GOVT. OF NCT OF DELHI
4TH FLOOR, ISBT BUILDING,
KASHMERE GATE, DELHI-110006

The Incharge (EIA Cell),
Delhi Pollution Control Committee (**DPCC**)
ISBT Building, 5th Floor,
Kashmere Gate, Delhi – 110 006.

Re.: Group Housing (Residential) Project at 1, 3 Cavalary Lane & 4 Chhatra Marg, Mall Road, Civil Lines, (Adjoining Vishwavidyalaya Metro Station), Delhi-7

Sub.: Environment Clearance granted by MOEF&CC vide Letter No. F. No IA3-21/ 15/ 2021-IA III dated 21.05.2021 – Consent to Establish (CTE) thereof

Dear Sir,

We have been granted Environment Clearance for our Group Housing (Residential) Project at 1, 3 Cavalary Lane and 4 Chhatra Marg, Civil Lines, Delhi by Ministry of Environment, Forest and Climate Change (MoEF&CC) on 21.05.2021 (**copy enclosed**). Condition in Para B-I (v) stipulates:

> *"The project proponent shall obtain Consent to Establish / Operate under the provisions of Air (Prevention & Control of Pollution) Act, 1981 and the Water (Prevention & Control of Pollution) Act, 1974 from the concerned State Pollution Control Board/ Committee."*

In this regard, we understand that DPCC is not issuing 'Consent To Establish' for buildings housing residential apartments / units following the Judgment dated 23.01.2012 of the Hon'ble High Court of Delhi in LPA No. 895 of 2010 in the matter of Delhi Pollution Control Committee vs Splendor Landbase Ltd. Relevant extracts are reproduced below:

> *"27. To summarize the position under the Water Act the position may be summarized thus: Section 25(1) of the Water Act would apply where a building is proposed to be constructed to set up an industry or carry on an operation or a process as explained in para 21 above and thus would mean that the Water Act **would not apply to buildings housing residential apartments/units.** It would apply to all other buildings where effluent or trade effluent is discharged, be they where manufacturing activity is carried on, sale or purchase of goods is carried on or services are provided.*
>
> *34. For our reasoning herein above pertaining to the Water Act, the said reasoning of the learned Single Judge pertaining to the Air Act is overruled, but would make no difference to the final conclusion arrived at by us pertaining to the applicability of the Air Act when construction activity commences in respect of shopping malls and commercial shopping complexes for the reason, prior consent to establish the same is required on the language of Section 21 of the Air Act in view of the expanded definition of the expression industrial plant. **But, for residential complexes, we hold that neither to establish nor to operate, (In fact the concept of to operate is not even applicable to a residential complex), any permission is required under the Air Act."***

In view of the aforesaid, kindly advise us whether or not we are required to obtain Consent to Establish / Operate as well as any other procedure to be followed in order to comply with the aforesaid EC condition.

We shall be highly obliged for an early reply.

Thanking you,

Yours truly,
For Young Builders Pvt. Ltd

Rajiv Ranjan Sharma
Vice-President – Project

Encl.: a/a

17-2

By Speed post/Mail

DELHI POLLUTION CONTROL COMMITTEE

DEPARTMENT OF ENVIRONMENT, (GOVT. OF NCT OF DELHI)
5th FLOOR, ISBT BUILDING, KASHMERE GATE, DELHI-6
(visit us at website : http://dpcc.delhigovt.nic.in/)

F. No DPCC/ EIA/EC/2021-22/ 2568-70

Dated : 27/08/2021

To,

Joint Secretary (Impact Assessment Division),
Ministry of Environment, Forest & Climate Change
Indira Paryavaran Bhawan , Jor Bagh Road,
New Delhi-110003.

Subject: Compliance of condition regarding obtaining Consent to Establish /Operate imposed in Environmental Clearance issued to Residential Complexes in Delhi

Sir,

This has reference to the Environmental Clearance issued for Group Housing Complex by Young Builders (P) Ltd. by MoEF&CC,GoI vide letter no F.No.IA3-21/15/2021-IA-III dated 21.05.2021. A representation dated 02.08.2021 received from the project proponent in this regard is enclosed (Annexure-I) for your reference.

Standard Condition at clause B.(I)(v) of the above said Environmental Clearance envisaged that the project proponent will obtain the Consent to Establish/ Operate from State Pollution Control Board/ Committee. The project proponent has represented in this regard vide aforesaid representation with the request to advise them whether or not they are required to obtain Consent to Establish/Operate as well as any other procedure to be followed in order to comply with the aforesaid EC condition.

The project is a group housing complex and DPCC is not issuing Consent to residential complexes in compliance of judgment dated 23.01.2012(copy enclosed as Annexure-II) pronounced by Division Bench of the Hon'ble High Court of Delhi. The Delhi Pollution Control Committee has filed the appeal before the Hon'ble Supreme Court against the said judgment of the Division Bench which is still pending.

In view of above, the condition of obtaining consent in the case under reference may kindly be looked in to suitably.

Yours Sincerely,

(K.S Jayachandran)
Member Secretary

Enclosures:

1. Annexure-I: Representation dated 02.08.2021.
2. Annexure-II: Hon'ble High Court of Delhi Judgment dated 23.01.2012.

Copy to:

1. Vice President, M/s Young Builders Private limited Group Housing (Residential) Project at 1,3 Cavalary Lane And 4, Chhatra Marg Mall Road, Civil Lines, (Adjoining Vishwavidyalaya Metro Station), Delhi – 110007
2. Regional Officer, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, Jaipur Camp Office, 5th Floor, Sector "H"Aliganj, Lucknow-226020.

2021.09.06 12:00

ANNEXURE-R26

No. F. 8(46)/COT/NFD/08-09/200-201
GOVT. OF NCT OF DELHI
DEPARTMENT OF FOREST AND WILF LIFE
OFFICE OF THE DEPUTY CONSERVATOR OF FOREST
NORTH FOREST DIVISION, KAMLA NEHRU RIDGE,
DELHI-110 007 (PH : 011-23853561)

Dated : 25th May 2011

To

M/s. Young Builder Pvt. Ltd.
43, Babar Road, Bengali Market,
New Delhi-110001

Sub.: Permission for removal/transplant of 156 nos. of trees (101 nos. of trees felling & 55 nos. of trees transplanting) standing at 1, 3 Cavalry Lane & 4, Chhatra Marg, mall Road, Civil Lines, Near Vishwavidyalaya Metro Station, Delhi-110007- reg.

Ref. 1. Your letter no. Nil, dated 03/03/2011 received in this office on 15/03/2011.

2. This office letter no. F.8(46)/COT/NFD/08-09/96-97, dated 03/05/2011.

3. Your letter vide no. Nil, dated 24/05/2011 received on 24/05/2011 alongwith Cheque No.406017, dated 23/05/2011 from Indusland Bank, Barakhamba Road, New Delhi- 01.

4. Govt. of NCT of Delhi Notification no. 8(16)/COT/NFD/08-09/194-99, dated 25/05/2011.

Kindly refer to the letter under reference for removal/ transplant of 156 nos. of trees (101 nos. of trees felling & 55 nos. of trees transplanting) standing at 1, 3 Cavalry Lane & 4, Chhatra Marg,

Mall Road, Civil Lines, Near Vishwavidyalaya Metro Station, Delhi-110007. Permission for felling/ transplant of above mentioned trees as per the enclosed authenticated list of the said trees is granted subject to the following :-

Conditions :-

1. In lieu of the 1.5 nos. of trees the applicant shall plant 1560 nos. saplings of 5-6 ft height and of local/indigenous tree species, like Amaltas, Kusum, Neem, Kachnar, Peepal, Jamun, Pilkhan and Shehtot etc. close to the site of existing tree within 9 months time and subsequently maintain the same for 3 years in accordance with Delhi Preservation of Tree Act, 1994.

2. Permission to remove/transplant the aforesaid trees is granted at your own risk and any other statutory requirement must be completed prior to the removal of the trees.

3. Felling/transplanting of above mentioned trees is done under the supervision of experienced horticulturist.

4. Felling/transplanting of the said 156 nos. trees shall be completed within 60 days time from the date of the permission.

5. Out of 156 nos. of trees, 55 nos. of trees shall be transplanted to Garhi Mandu City Forests Nursery.

6. Applicant shall be fully responsible for this matter after the felling of the aforesaid trees; and for any dispute and judicial implication in the court.

7. The sum of Rs. 43,68,000/- vide Bankers Cheque no. 406017, dated 23/05/2010 from IndusInd Bank, Barakhamba Road, New Delhi-110001 deposited as Security Deposit with refundable/non-refundable component of Rs.14,000/- per tree for ensuring compensatory plantation by the applicant viz. a viz. the Forest Department shall be refunded only after confirmation of the creation of the complete plantation and subsequently on successful maintenance of the raised seedlings properly for three years and its verification. In case of failure to create the plantation or failure to confirm this office about the creation of the 1560 nos. of plantation on or before 9 months time of the issue of this letter or failure to maintain the created saplings properly and satisfactorily for 3 years the security amount shall be forfeited and action shall be taken as per DPTA 1994.

8. All the concerned institutions/nearby residents/ other owners of the trees (if any) must be intimated in advance of the removal of the aforesaid trees.

9. Wood so obtained after removal to be sent necessarily to MCD public crematoria Nigam Bodh Ghat and to be confirmed with complete delalls and documents within a month.

10. Shri Ram Kumar Joshiya, IO of this division is being deputed for the monitoring/ tree felling of the above said work. You are requested to intimate this office at least 3 days in advance before starling the felling of the said trees.

Sd/-
(Nisheeth Saxena)
Dy. Conservator of Forests
North Forest Divlsion/Tree Officer

Copy to:-

1. Shri Ram Kumar Joshiya, IO for information & necessary action & submit the overall report.

Sd/-
Dy. Conservator of Forests
North Forest Division/Tree Officer

Gmail

1331

Rajesh Chauhan <chauhanrajes@gmail.com>

National Green Tribunal, Principal Bench, New Delhi | Appeal No. 17 of 2021 | Delhi University vs. MoEF and CC & Anr. | Counter on behalf of Young Builders Pvt. Ltd.

1 message

Anirudh Bhatia <anirudh.bhatia@aglaw.in> Mon, Sep 27, 2021 at 10:44 PM
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Dear Sir,

We write on behalf of, and on instructions from, our Client, i.e., Young Builders Pvt. Ltd., Respondent No. 2 in the captioned matter, pending before the National Green Tribunal, Principal Bench at New Delhi.

Please find below a OneDrive Link containing the Counter-Affidavit on behalf of Young Builders Pvt. Ltd., in three (3) volumes.

Kindly treat this email as official service of the Counter-Affidavit upon you, and acknowledge receipt thereof.

Thank you.

https://aglawindia-my.sharepoint.com/:f:/g/personal/anirudh_bhatia_aglaw_in/Ei31UOLU7NREhBNfSWaJFOgBWAH2MUkco_ZrOkH9k4bSQA?e=Ekgxnq

Warm Regards,

Anirudh Bhatia

Associate

Agarwal Law Associates

Advocates for Respondent No. 2, Young Builders Pvt. Ltd.

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1332



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