BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL, PRINCIPAL BENCH, NEW DELHI

COMPLIANCE OF APPENDIX-X OF MOEF&CC NOTIFICATION NO. S.O. 141(E) DATED 15.01.2015 AND ENFORCEMENT & MONITORING GUIDELINES FOR SAND MINING 2020 WITH RESPECT TO PREPARATION OF UPDATED DSR OF DISTRICT SAHARANPUR – YEAR-2022

MR. ATMARAM N.S. NADKARNI

SENIOR ADVOCATE FOR STATE OF U.P.

IN

Original Application No. 1345/2024 (IA No 624/2024, IA No. 625/2024)

WITH

Original Application No. 119/2025 (IA No 189/2025)

WITH

Original Application No. 134/2025

WITH

Original Application No. 247/2025

WITH

Original Application No. 427/2025

Compliance of the APPENDIX-X of the MoEF&CC Notification No. S.O. 141(E), dated 15-Jan-2016 w.r.t. preparation of Updated DSR Saharanpur – Year-2022

- The Updated DSR Saharanpur – Year-2022 was prepared in line with the MoEF&CC Notification No. S.O. 141(E), dated 15-Jan-2016. APPENDIX-X of this Notification provides Procedure for Preparation of District Survey Report. The procedure provides structure for preparation of Report in 11 points with some additional points which are unnumbered in the Notification.
- **Point wise requirement of the Notified Structure and Reference of Compliance done w.r.t. DSR Saharanpur is as under:-**

Requirement of the Notified Structure	**Reference of O.A with Remarks**	**Reference Page(s) of O.A**
1. Introduction	O.A. 1345/2024 – Anees Ali	**@Pages 299-301**
2. Overview of Mining Activity in the District	O.A. 1345/2024 – Anees Ali	**@Pages 302-303**
3. List of Mining Leases in the District with location, area and period of validity.	O.A. 1345/2024 – Anees Ali	**@Pages 304-306**

4. Details of Royalty or Revenue received in last three years.	O.A. 1345/2024 – Anees Ali	**@Pages 307-308**
5. Detail of Production of Sand/Morrum/RBM or other minor mineral in last three years.	O.A. 1345/2024 – Anees Ali	**@Page 309**
6. Process of deposition of sediments in the Rivers of the District	O.A. 1345/2024 – Anees Ali	**@Pages 310 – 315**
7. General Profile of the District.	O.A. 1345/2024 – Anees Ali	**@Pages 316**
8. Land utilization Pattern in the district: Forest, Agriculture, Horticulture, Mining etc.	O.A. 1345/2024 – Anees Ali	**@Pages 317-318**
9. Physiography of the District.	O.A. 1345/2024 – Anees Ali	**@Pages 320-321**
10. Rainfall: month-wise.	O.A. 1345/2024 – Anees Ali	**@Pages 322-323**
11. Geology and Mineral Wealth.	O.A. 1345/2024 – Anees Ali	**@Pages 324-328**
12. In addition to the above, the report shall contain the following:	O.A. 1345/2024 – Anees Ali	**@Pages 329-330**
	<u>To be read with</u>	
a) District wise detail of river or stream and other sand source; b) District wise availability of sand or gravel or aggregate resources;	DM Affidavit dated 11.09.2025 in O.A. 119/2025 - Mursleen (Replenishment Study Report-2022 Volume-I & IV)	**@Pages 389-507**
	<u>To be additionally read with</u>	

c) District wise detail of existing mining leases of sand and aggregates. 13. Drainage system with description of main rivers Salient Features of Important Rivers and Streams 14. Mineral Potential 15. Annual Deposition	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-II , III,V & VI** **Please refer page numbers mentioned in Upper Right corner.** **@internal Pages-1-950**

COMPLIANCE OF EMGSM-2020 GUIDELINES W.R.T.

DISTRICT SURVEY REPORT – YEAR 2022, DISTRICT - SAHARANPUR

Requirement of EMGSM-2020 Guidelines	**Reference of O.A with Remarks**	**Reference Page(s) of O.A**
4.1.1 Preparation of District Survey Report.		
a) District Survey Report for sand mining shall be prepared before the auction/e-auction/grant of the mining lease/Letter of Intent (LoI) by Mining department or department dealing the mining activity in respective states.	O.A. 1345/2024 – Anees Ali	**DSR Approved by Member Secretary SEIAA on 07.06.2024 @Page 294**
	O.A. 1345/2024 – Anees Ali	**e-auction Notice dated 28.02.2025 @Pages 346-350**
b) The first step is to develop the inventory of the River Bed Material and Other sand sources in the District. In order to make the inventory of River	O.A. 1345/2024 – Anees Ali	**Inventory of the River Bed Material. @Pages 304-306**

Bed Material, a detailed survey of the district needs to be carried out, to identify the source of River Bed Material and alternative source of sand (M-Sand). The source will include rivers, de-siltation of reservoir/dams, Patta lands/Khatedari Land, M-sand etc.		
	O.A. 1345/2024 – Anees Ali	**Annexure-1 - Other sand sources** **@Page 332**
	DM Affidavit dated 11.09.2025 in O.A. 119/2025 – Mursleen	**Replenishment Study Report-of Year 2022 Volume-I & IV** **@Pages 389-507**
	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-II , III,V & VI** **Please refer page numbers mentioned in Upper Right corner.** **@ internal Pages-1-950**
The revenue department of Kerala already conducted river mapping and sand auditing of	The expression "River Audit" is not prescribed	**Kerala State Act, 2001; SSMG-2016; EMGSM-2020.**

around 20 rivers of Kerala which is a good example wherein the profile of rivers was created at regular intervals and aggradation/deposition was identified along with water level. In the same study, benchmarks were also created at a prominent location at regular interval for future surveying. Such study helps the mining departments to identify the source of sand. Thus, it is proposed that for preparation of district survey report, the auditing of rivers needs to be carried out. There is already a provision under MMDR Act 2015 for National Mineral Exploration Trust (MET) wherein a 2% of royalty amount to be deposited in the trust. This fund is used for mineral exploration in the country. The Sand Auditing is also a sort of identification of mineral and State Government may request Central Govt. for proving funds for river auditing. The Central Govt. (Ministry	under the applicable Guidelines. The terminology is used in the State of Kerala owing to the Kerala Protection of River Banks and Regulation of Removal of Sand Act, 2001. What is material is compliance with the scientific requirements prescribed under the Guidelines, all of which have been duly undertaken.	

of Mines) may also explore the possibilities for providing the funds for river auditing. The other option is that State Govt. may conduct such studies by its own fund and the same may be recovered from the leaseholders to whom the mining lease will be allocated.		
c) District Survey Report is to be prepared in such a way that it not only identifies the mineral-bearing area but also define the mining and no mining zones considering various environmental and social factors.	O.A. 1345/2024 – Anees Ali	**Mining lease areas specifically identified and notified in the DSR. All areas outside identified lease areas constitute No-Go Areas as mining cannot be undertaken without a valid lease under the MMDR Act, 1957.** **@Pages 304-306**

d) Identification of the source of Sand & M-Sand. The sources may be from Rivers, Lakes, Ponds, Dams, De-silting locations, Patta land/Khtedari lands. The details in case of Rivers such as [name, length of river, type (Perennial or Non-Perennial), Villages, Tehsil, District], in case of Lakes, Ponds, Dams, De-silting locations [Name, owned/maintained by (State Govt./PSU), area, Villages, Tehsil, District] in case of Patta land/Khtedari lands [Owner Name, Sy No, Area, Agricultural/Non-Agricultural, Villages, Tehsil, District], in case of M-Sand Plant [Owner Name, Sy No, Area, Quantity/Annum, Villages, Tehsil, District], needs to be recorded as per format given in Annexure-I.	O.A. 1345/2024 – Anees Ali	**Annexure-1 – Details of Sand/M-Sand Sources Identified.** **@Page 332**
e) Defining the sources of Sand/M-Sand in the district is the next step for identification of the potential area of deposition/aggradation wherein	O.A. 1345/2024 – Anees Ali	**Annexure-II – List of Potential Mining Leases identified.**

mining lease could be granted. Detailed survey needs to be carried out for quantification of minerals. The purpose of mining in the river bed is for channelization of rivers so as to avoid the possibility of flooding and to maintain the flow of the rivers. For this, the entire river stretch needs to be surveyed and original ground level (OGL) to be recorded and area of aggradation/deposition needs to be ascertained by comparing the level difference between the outside riverbed OGL and water level. Once the area of aggradation/deposition are identified, then the quantity of River Bed Material available needs to be calculated. The next step is channelization of the river bed and for this central ¾th part of the river, width needs to be identified on a map. Out of the ¾th part area, where there is a		**@Pages 333-336**
	DM Affidavit dated 11.09.2025 in O.A. 119/2025 – Mursleen	**Replenishment Study Report-2022 Volume-I & IV** **@Pages 389-507**
	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-II , III,V & VI** **Please refer page numbers mentioned in Upper Right corner.** **@ internal Pages-1-950**
	DM Affidavit dated 11.09.2025 in O.A. 119/2025 – Mursleen.	**River Morphology Assessment done.** **@Pages 400-403** **@Pages 414-416**
	O.A. 427/2025- Ameel Khan	**Preference to Braided Channel mining under**

deposition/aggradation of the material needs to be identified. The remaining ¼th area needs to be kept as no mining zone for the protection of banks. The specific gravity of the material also needs to be ascertained by analyzing the sample from a NABL accredited lab. Thus, the quantity of material available in metric ton needs to be calculated for mining and no mining zone. Note: As physical survey with conventional method is time-consuming, use of unmanned aerial vehicle (UAV) may be explored to carry out the survey and finalizing the original ground level and for developing a 3D model of the area.		**mining plan section of EMGSM-2020 Guidelines.** **@Page 165 (Point-g)** **Such (1/4th , 3/4th) criteria cannot be rigidly applied to braided river systems due to natural channel migration.**
f) The permanent boundary pillars need to be erected after identification of an area of aggradation and deposition outside the bank of the	Permanent boundary pillars are erected at the time of survey and	**UPMMCR-2021**

river at a safe location for future surveying. The distance between boundary pillars on each side of the bank shall not be more than 100 meters.	demarcation of the area granted under the lease prior execution of lease deed in compliance to Rule-36 of UPMMCR-2021.	
g) Identifying the mining and no mining zone shall follow with defining the area of sensitivity by ascertaining the distance of the mining area from the protected area, forest, bridges, important structures, habitation etc. and based on the sensitivity the area needs to be defined in sensitive and non-sensitive area.	Supplementary Affidavit of DM Saharanpur dated 13.04.2026 filed in O.A. 573/2025 – Ameel Khan	**Mining areas assessed in terms of Environmental Sensitivity like Eco-Sensitive Zone, Forest, Embankment , Reservoir and NOC from Forest and Irrigation Department on these aspects has been taken for each proposed lease in the DSR.** **@Pages 1382-1390**

h) Demand and supply of the Riverbed Material through market survey needs to be carried out. In addition to this future demand for the next 5 years also needs to be considered.	O.A. 119/2025 – Mursleen	**Market Analysis done in DSR Chapter-4 @Page 268, 272, 274**
i) It is suggested that as far as possible the sensitive areas should be avoided for mining, unless local safety condition arises. Such deviation shall be temporary & shall not be a permanent feature.	Supplementary Affidavit of DM Saharanpur dated 13.04.2026 filed in O.A. 573/2025 – Ameel Khan	**Lease wise Joint Survey / Demarcation Report were prepared on the basis of site specific physical inspection. Mining areas has been assessed in terms of Environmental Sensitivity like Eco-Sensitive Zone, Forest, Embankment , Reservoir and NOC from Forest and Irrigation Department on these aspects has been taken for**

		each proposed lease in the DSR. **@Pages 1372-1390**
j) The final area selected for the mining should be then divided into mining lease as per the requirement of State Government. It is suggested the mining lease area should be so selected as to cover the entire deposition area. Dividing a large area of deposition/aggradation into smaller mining leases should be avoided as it leads to loss of mineral and indirectly promote illegal mining.	O.A. 1345/2024 – Anees Ali	**After Survey, final areas were selected and inventoried under Chapter-3 of DSR.** **@Pages 304-306**
k) Cluster situation shall be examined. A cluster is formed when one mining lease of homogenous mineral is within 500 meters of the other mining lease. In order to reduce the cluster formation mining lease size should be defined in such a way that distance between any two clusters preferably should not be less than 2.5 Km. Mining lease	O.A. 1345/2024 – Anees Ali	**Appendix XI of the statutory Notification dated 15.01.2016 specifically contemplates clusters of mines. The statutory Notification governs the field and expressly permits cluster-**

should be defined in such a way that the total area of the mining leases in a cluster should not be more than 10 Ha.		**based environmental appraisal) @Page 117**
l) The number of a contiguous cluster needs to be ascertained. Contiguous cluster is formed when one cluster is at a distance of 2.5 Km from the other cluster.	O.A. 1345/2024 – Anees Ali	**No Contiguous cluster exist and same is Notified in DSR Annexure-III @Page 337**
m) The mining outside the riverbed on Patta land/Khatedari land be granted when there is possibility of replenishment of material. In case, there is no replenishment then mining lease shall only be granted when there is no riverbed mining possibility within 5 KM of the Patta land/Khatedari land. For government projects, mining could be	O.A. 1345/2024 – Anees Ali	**There is no mining proposed outside the riverbed. Same Notified in DSR Annexure-II @Page 336**

allowed on Patta land/Khatedari land but the mining should only be done by the Government agency and material should not be used for sale in the open market. Cluster situation as mentioned in para k above is also applicable for the mining in Patta land/Khatedari land.		
n) The State Government should define the transportation route from the mining lease considering the maximum production from the mines as at this stage the size of mining leases, their location, the quantity of mineral that can be mined safely etc. is available with the State Government. It is suggested that the transportation route should be selected in such a way that the movement of trucks/tippers/tractors from the villages having habitation should be avoided. The transportation route so selected should be	O.A. 1345/2024 – Anees Ali	**Transport route Notified in Annexure-IV of the DSR @Pages 338-339**

verified by the State Government for its carrying capacity.		
o) Potential site for mining having its impact on the forest, protected area, habitation, bridges etc, shall be avoided. For this, a sub-divisional committee may be formed which after the site visit shall decide its suitability for mining. The list of mining lease after the recommendation of the Committee needs to be defined in the following format given in as Annexure-II. The Sub-Divisional Committee after the site visit shall make a recommendation on the site for its suitability of mining and also records the reason for selecting the mining lease in the Patta land. The details regarding cluster and contiguous cluster needs to be provided as in Annexure-III. The details of the transportation need to be provided as in Annexure IV.	Supplementary Affidavit of DM Saharanpur dated 13.04.2026 filed in O.A. 573/2025 – Ameel Khan	**Lease wise Joint Survey / Demarcation Report were prepared on the basis of site specific physical inspection. Mining areas has been assessed in terms of Environmental Sensitivity like Eco-Sensitive Zone, Forest, Embankment , Reservoir and NOC from Forest and Irrigation Department on these aspects has been taken for each proposed lease in the DSR on the basis of which Annexure I to IV prepared**

		@Pages 1372-1390 & **@Pages 1343-1346**
p) Public consultation-The Comments of the various stakeholders may be sought on the list of mining lease to be auctioned. The State Government shall give an advertisement in the local and national newspaper for seeking comments of the general public on the list of mining lease included in the DSR. The DSR should be placed in the public domain for at least one month from the date of publication of the advertisement for obtaining comments of the general public. The comments so received shall be placed before the sub-divisional committee for active consideration. The final list of sand mining areas [leases to be granted on riverbed & Patta land/Khatedari land, de- siltation location (ponds/lakes/dams), M-Sand Plants (alternate source of sand)] after the public	Supplementary Affidavit of DM Saharanpur dated 13.04.2026 filed in O.A. 573/2025 – Ameel Khan	**Public Consultation process completed.** **@Page 1394.**

hearing needs to be defined in the final DSR in the format as per Annexure-V. The details regarding cluster and contiguous cluster needs to be provided in Annexure-VI. The details of the transportation need to be provided in Annexure-VII.		

Compliance of EMGSM-2020 Guidelines

REGARDING REPLENISHMENT STUDY

EMGSM-2020 Requirements	Reference of O.A with Remarks	Reference Page(s) of O.A
5.0 REPLENISHMENT STUDY		
The need for replenishment study for river bed sand is required in order to nullify the adverse impacts arising due to excessing sand extraction. Mining within or near riverbed has a direct impact on the stream's physical characteristics, such as channel geometry, bed elevation, substratum composition and stability, in-stream roughness of the bed, flow velocity, discharge capacity, sediment transport capacity, turbidity, temperature etc. Alteration or modification of the above attributes may cause	DM Affidavit dated 11.09.2025 in O.A. 119/2025 – Mursleen	**In Chapter-2 of the Volume-I of Replenishment Study Report-Year 2022, Need Assessment has been done. @Page 396**

an impact on the ecological equilibrium of the riverine regime, disturbance in channel configuration and flow-paths. This may also cause an adverse impact on in- stream biota and riparian habitats. It is assumed that the riparian habitat disturbance is minimum if the replenishment is equal to excavation for a given stretch. Therefore, to minimize the adverse impact arising out of sand mining in a given river stretch, it is imperative to have a study of replenishment of material during the defined period.		
5.1 Generic Structure of Replenishment Study		
Initially replenishment study requires four surveys. The first survey needs to be carried out in the month of April for recording the level of mining lease before the monsoon. The second	DM Affidavit dated 11.09.2025 in O.A. 119/2025 – Mursleen	**Two surveys of Pre and Post Monsoon 2022 done. @Pages 389-507**

survey is at the time of closing of mines for monsoon season. This survey will provide the quantity of the material excavated before the offset of monsoon. The third survey needs to be carried out after the monsoon to know the quantum of material deposited/replenished in the mining lease. The fourth survey at the end of March to know the quantity of material excavated during the financial year. For the subsequent years, there will be a requirement of only three surveys. The results of year-wise surveys help the state government to establish the replenishment rate of the river. Based on the replenishment rate future auction may be planned. The replenishment period may vary on nature of the channel and season of deposition arising due to variation in the flow. Such period and		

season may vary on the geographical and precipitation characteristic of the region and requires to be defined by the local agencies preferable with the help of the Central Water Commission and Indian Meteorological Department. The excavation will, therefore, be limited to estimated replenishment estimated with consideration of other regulatory provisions.		
5.2 Methodology for Replenishment Study		
The replenishment estimation is based on a theoretical empirical formula with the estimation of bedload transport comprising of analytical models to calculate the replenishment estimation. The iso-pluvial maps of IMD can be used for estimation of rainfall. Catchment yield is computed using different standard empirical formulas relevant to the geographical and channel attributes. eg. Strange's Monsoon runoff	DM Affidavit dated 11.09.2025 in O.A. 119/2025 – Mursleen DM Affidavit dated 11.09.2025 in O.A. 119/2025 - Mursleen	**Methodology of Replenishment Established @Pages 397-398** **Particle size distribution done. Bulk Density of RBM i.e. Sand/Bajri/Boulder**

curves for runoff coefficient). Peak flood discharge for the study area can be calculated by using Dickens, Jarvis and Rational formula at 25, 50 and 100 years return period. The estimation of bed load transport using Ackers and White Equation or similar can be made. A simulation model is used with basic data generated from the field in the pre-study and post-study period (preferably pre-monsoon and post-monsoon) to estimate the volume of replenished material. The particle size distribution and bulk density of the deposited material are required to be assessed from a NABL recognized laboratory. Considering the bulk density and the volume, the estimation of replenishment in weight will be calculated after considering safeguards and stability of the slopes and riverine regime. Some of the		**in mixed state already done by DGM Lucknow in year 2021.** **@Pages 410-413**

common methods used for field data acquisition for replenishment study		
5.2.1. Physical survey of the field by the conventional method		
i. The conventional survey technical using DGPS and other survey tools are used to define the topography, contours and offsets of the lease area. The survey should clearly depict the important attributes of the stretch of the river and its nearby important civil and other feature of importance. Such information will provide the eligible spatial area for mining. The contour and the elevation benchmarks will provide the baseline data for assessing the pre and post-study period scenario.	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume- V showing lease specific topography, drainage, contour, etc.** **Please refer page numbers mentioned in Upper Right corner.** **@ internal Pages 399- 642**
ii. Physical benchmarks are to be fixed at appropriate intervals (preferable 1 in 30 m) and	Additional Document e-filed on 30.05.2026	**All RL and Reference Control points taken and**

the Reduced Level (RL) shall be validated from a nearby standard RL. These RL should be engraved on a steel plate (Bench Plate) and shall be fixed and placed at locations which are free from any damages and are available in pre and post-study period. The bench plates shall be available for use during the mining period as reference for all mining activity. Reference pillar may also be used in place of Bench Plates with visible and readable demarcation on the ground as common reference points to control the topographic survey and mining activity.		**report in Replenishment Study Report-2022 Volume-II , III,V & VI Please refer page numbers mentioned in Upper Right corner. @ internal Pages 643-847**
iii Baseline data on elevation status for a grid of 10 m x 10 m is preferred to have accuracy in the assessment. It is expected that two consecutive cross-sections in longitudinal and lateral direction should not be more than 10-meter distance apart, however, the regulatory authority	Additional Document e-filed on 30.05.2026	**Lease Wise Data of Grid Ground Control Points, Cross-Sections reports on Volume-V-A**

may fix these intervals depending on the geographical and site-specific conditions, only and after providing the scientific reason for such deviation.		**Please refer page numbers mentioned in Upper Right corner. @ internal Pages 643-847 For Example one lease called Sherpur Pelo is covered @ internal Pages No. 644-650 showing Data of Grid Ground Control Points, Cross-Sections.**
iv The changes observed in the elevation in per and post scenario at each node should be depicted in graphical forms with an appropriate scale to estimate the area of deposition and	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-V-A shows lease wise cross section of change**

erosion. These graphical presentations should depict the active channel regime and the flow bed elevation with other important features required to be considered for estimation of the mining area. The area of deposition and erosion shall be calculated for each cross-section after giving due regard to the stability and safety of active channel banks, and other features of importance. The elevation level shall be in reference to the nearest bench-plates established for the purpose.		**in pre and post monsoon along with Grid Table Reporting.** **Please refer page numbers mentioned in Upper Right corner. @internal Pages 643-847** **For Example one lease called Sherpur Pelo is covered @internal Pages No. 644-650 showing cross section of change in pre and post**

		monsoon along with Grid Table Reporting.
v The levels (MSL & RL) of the corner point of each grid should be identifiable and safety barriers (Non-Mining) demarcated as restricted in consensus with Mineral Concession Rules of respective State, and the provision mentioned in this Sustainable Sand Mining Management Guidelines.	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-II , III,V & VI. Please refer page numbers mentioned in Upper Right corner. @ internal Pages 1-950**
vi A clear identification is required to be highlighted between grids under mineable and grids under the non-mineable area. These baseline data (pre and post) be subjected to stimulation with the help of data mine software to derive at the replenishment area and corresponding	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-II , III,V & VI provides gride wise analysis of leases with observed cross-sections for each lease in Pre**

volume and estimated weight.		**and Post Monsoon Period.** **Please refer page numbers mentioned in Upper Right corner.** **@ internal Pages 1-950**
vii The database should be structured in a tabulated form clearly depicting the nomenclature of the section lines, latitude and longitude of the starting point, chain-age and respective levels of all the points taken on that section line	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-V-A – Longitude / Latitude / Sections/ Selected Points of Elevation.** **Please refer page numbers mentioned in Upper Right corner.**

		@ internal Pages 643-847
viii Net area shall be derived after the summation of the area of deposition minus area of erosion for each cross-section. The volume will be estimated by multiplying the distance between two cross-sections with the average of net area of these two consecutive cross-sections.	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Cross-Section and Deposition depicted for each Lease. Volume-V-A** **Please refer page numbers mentioned in Upper Right corner.** **@internal Pages 643-847**
ix One sample per 900 square meters (30 m x 30 m) shall be preferred sample density for assessment of bulk density for estimation of deposition rate. Care should be	DM Affidavit dated 11.09.2025 in O.A. 119/2025 - Mursleen	**Replenishment Study Report-2022 Volume-I – Particle size distribution**

taken that the sample for assessment of bulk density is taken from the deposition zone and not from erosion. However, depending on the site condition, river morphology and geographical condition, sample density may be adjusted. Reason for such deviation shall be appropriately highlighted in the report with supporting scientific data.		**done. Bulk Density of RBM (Sand/Bajri/Boulder in mixed start) already done by DGM Lucknow in year 2021 @Pages 410-413**
5.2.2 Use of UAV/Drone and other image data processing techniques		
With the development in image data processing tools and its accuracy acceptability, Drone/UAV fitted with the advance camera are used for survey purposes. Such technology has promising potential in the survey of sand mining zones due to its fast and reliable output deliveries. The survey is conducted using a set of instruments and compatible software to	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-V. Drone Survey captured data was processed and Ortho, DTM with contours prepared for each lease. On the basis of change in Contour**

utilized the properly referenced data for depicting the topography of the study area. Instrument calibration and software compatibility and its validation with the ground data are an essential requirement for using this technique. The details of the instruments their limitation and software used shall be demonstrated in the form of the accuracy assessment report, through a chapter in the replenishment study report. Other details to be incorporated in the report with regard to the study using such imaginary techniques shall highlight the followings a) **Flight Planning: -** The lease co-ordinates and the flight plan devised to capture the front and side overlap percentages for in each flight in reference to global		**profile in Post-Monsoon Replenishment Data Reported.** **Please refer page numbers mentioned in Upper Right corner. @internal Pages 399-642**

coordinates (Kml or SHP file) system. The software used for the purpose and its details along with limitations with basic analytical assumptions. b) **Block file generation:** - This operation concerns the selection of the sensor model and the definition of block properties, the addition of imagery to the block file, marking of GCPs, generation of tie points and refining of the model. c) **Interior orientation:** - The interior orientation of the stereo pair rational polynomial coefficients (RPC) used, which should be bundled with the scenes. RPCs are coefficient, which is used by photogrammetric software to represent the ground to-image viewing geometry. d) **Exterior orientation:** For exterior orientation, ground control points shall be		

used, which are collected from the DGPS survey. e) **Aero Triangulation:** - A critical phase in photogrammetric mapping is to rectify the satellite imagery at an appropriate tract on the surface of the earth. This is accomplished by collecting horizontal and vertical data [GCP's] to ascertain the spatial location of a number of features that are visible and measurable on the aerial images – this process is often called control bridging, which refers to passing horizontal and vertical information from one aerial image to the next. f) **Ortho Generation:** - After running the above steps; the software shall automatically generate orthorectified imagery.		

g) **DTM extraction:** For extraction of DTM, Generated point cloud data classified manually to extract bare earth.		
5.2.3 Accuracy Assessment of Aerial Data		
To check the accuracy of DTM generated by Aerial data, few points are selected and compared with on-site by using DGPS instrument for the ground-truthing purpose. It is preferred to do ground-truthing at minimum 5 locations spread evenly across the lease area. The readings from the DGPS instrument are then compared with the Drone data for accuracy assessment purpose. A comparative chart will be prepared in comparison of Data related to ground-truthing (by DGPS) and from Drone. Such accuracy assessment report shall a chapter of the replenishment study.	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-V. Ground Control Points fixed as per DGPS Survey in minimum 6 locations and on the basis of DGPS Elevation Data Drone image process for DTM Extraction and results produced.**

		Please refer page numbers mentioned in Upper Right corner. @internal Pages 399-642
5.2.4 Replenishment study shall have the details of		
List of instruments	DM Affidavit dated 11.09.2025 in O.A. 119/2025 – Mursleen	**Chapter 6 – List of Equipment's / Manpower / Software's @Page 425**
List of software	DM Affidavit dated 11.09.2025 in O.A. 119/2025 – Mursleen	**Chapter 6 – List of Equipment's / Manpower / Software's @Page 425**

Establishment of Benchmark by putting No. of pillar points and various Ground Control Points (GCP) at the site.	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-V-A – Ground Control Points Fixed and Data Recorded in Sheet and Shown in Tabulated Form.** **Please refer page numbers mentioned in Upper Right corner. @internal Pages 643-847**
Ground Control Points (GCP) Collection: - Various GCPs were observed by using DGPS for Permanent Benchmarks and for control points.	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-V-A. Ground Control Points Collected**

		and Shown for each Lease. **Please refer page numbers mentioned in Upper Right corner. @internal Pages 643-847**
The summary of the elevation data from each section's profile based on the post-monsoon the survey should have mentioned in the table form.	Aneel Ali O.A. 1345/2024	**Lease wise Summary of Pre and Post Monsoon Elevation data shown in Table No. PM/001 @Page 330**
The detail of post-monsoon survey data in the tabular form shall be	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-V-A.**

		Please refer page numbers mentioned in Upper Right corner. @internal Pages 643-847
The detailed comparison of both pre-monsoon and post-monsoon elevation data shall be attached	DM Affidavit dated 11.09.2025 in O.A. 119/2025 – Mursleen	**@Pages 432-454 (pre-monsoon)** **@Pages 475-498 (post-monsoon)**
Cross-sectional depiction of deposition and erosion for each section in pre and post-deposition season shall be given supported by relevant field study data and plan.	Additional Document e-filed on 30.05.2026	**Replenishment Study Report-2022 Volume-V-A. Lease wise Cros-section of deposition / erosion depicted in**

		pre and post monsoon period. **Please refer page numbers mentioned in Upper Right corner. @intenal Pages 643-847**