BEFORE THE NATIONAL GREEN TRIBUNAL

EASTERN ZONE BENCH KOLKATA

Original Application No. 05/2022/EZ

IN THE MATTER OF:

Dr. Bina Basnett ... Applicant

Versus

State of Sikkim and Ors. ... Respondents

INDEX

S.No.	Particulars	Pg.No.
1.	Counter Affidavit on behalf of the Respondent No. 3 Department of Mines and Geology, Government of Sikkim to the Original Application	3-20
2.	**ANNEXURE R/1-** True copy of the Notification dated 16.10.2001 of UD & HD, Department Government of Sikkim	21
3.	**ANNEXURE R/2-** True copy of Letter bearing Memo No. 84/SPV/GSCDL/2018-19 dated 23.11.2019 from Office of the Gangtok, Smart City development Limited, Sokaythang, Gangtok, East Sikkim	22
4.	**ANNEXURE R/3-** True copy of the detailed Geological and Geo-Technical Investigation Report of the Land proposed for the construction of various structures at Old West Point School, Gangtok East Sikkim dated March 2020	23-41
5.	**ANNEXURE R/4-** True copy of Letter bearing Ref. no. MIPL/HO/18/2021-22 dated 21.09.2021 from MESASO Infrastructure Private Limited	42
6.	**ANNEXURE R/5-** True copy of Appointment Letter bearing Memo No. 197/GSCDL/2021-22	43

	dated 30.06.2021received from MESASO Infrastructure Private Limited	
7.	**ANNEXURE R/6-**True copy of the Site Stability Report dated 29.12.2021	44
8.	**ANNEXURE R/7-** True copy of 2011 detailed report Geological and Geo- Technical investigation of the surrounding areas within a Gangtok, East Sikkim	45-72
9.	**ANNEXURE R/8-** True copy of Notification No.17/DMG/20-21 dated 19.03.2021 issued by Department of Mines and Geology, Government of Sikkim	73-77
10.	**ANNEXURE R/9-** True copy of the Letter dated 17.02.2022 issued by the Department of Mines & Geology to M/s Mesaso Infrastructure Private Ltd	78
11.	**Vakalatnama**	79

DATE: 25.02.2022

PLACE: KOLKATA

DRAWN AND FILED BY:

Sudesh Joshi

Addl. Advocate General

Govt. of Sikkim.

BEFORE THE NATIONAL GREEN TRIBUNAL

EASTERN ZONE BENCH KOLKATA

Original Application No. 05/2022/EZ

IN THE MATTER OF:

Dr. Bina Basnett ... Applicant

-Versus-

State of Sikkim and Ors. ...Respondents

COUNTER AFFIDAVIT OF THE RESPONDENT NO. 3DEPARTMENT OF MINES AND GEOLOGY, GOVERNMENT OF SIKKIM

TO

THE HONOURABLE CHAIRPERSON AND HIS

COMPANION MEMBER OF THE

HON'BLE NATIONAL GREEN TRIBUNAL

EASTERN ZONE BENCH KOLKATA

The Humble Counter Affidavit of the Respondent No. 3

MOST RESPECTFULLY SHEWETH:-

I, Sonam Ongden Lepcha aged about 57 years, serving as Addl. Director at Department of Mines and Geology, Government of Sikkim. I am Respondent No. 3 and I am well acquainted with the facts and circumstances of the present matter as such I am competent to swear and file this application before this Hon'ble Tribunal, I do hereby solemnly affirm and state as follows:-

1. PRELIMINARY SUBMISSIONS:-

i. At the very outset it is submitted that the original applicant has not come with clean hands before this Hon'ble Tribunal as the Original Applicant has

suppressed vital information and documents and as such the application deserves dismissal at the very threshold on the count of suppression of material facts and for misleading this Hon'ble Tribunal.

ii. That it is submitted that all the material allegations made in the Application against this answering Respondent are false and fabricated and the Application is not maintainable either on facts or in law against the answering Respondent.

iii. That save and except what has been specifically admitted herein, the rest of the statements made in the Application may be deemed to have been denied and repudiated by the answering Respondent. The deponent humbly begs to state further that the answering Respondent does not admit anything which is contrary to the record. Further, crave leave of this Hon'ble Tribunal to file an additional affidavit in reply if necessary.

2. <u>STATEMENT OF FACTS</u>:-

That before traversing the reply on merits, the answering Respondent begs to submit the following submissions materials for correct appreciation and proper adjudication of instant Application:-

2.1. That the aim and objectives of the Respondent No. 3, Department of Mines& Geology are to, establish exploitable reserves minerals of the state, carry out geo-technical investigations, monitor water resources for public consumption and cater to the geological input need of the Central & State Government agencies in the State.

2.2. That the answering Respondent, among other things, engages and carries out Geological and Geo-technical investigations of sites and provides site stability report in accordance with the Notification no.GOS/UD&HD/6(294)2001/A dated 16.10.2001 of UD & HD, Department Government of Sikkim at the request of the individual or several applicant / applicant(s) in the State of Sikkim. True copy of the Notification dated 16.10.2001 of UD & HD, Department Government of Sikkim is marked and appended as **ANNEXURE R/1.**

2.3. It is pertinent to mention that the answering Respondent received a requisition letter dated 23.11.2019, bearing Memo No.

84/SPV/GSCDL/2018-19, from the Office of Gangtok, Smart City Development Limited, Sokaythang, Gangtok, East Sikkim under the signature of its Nodal Officer requesting for a Geo technical and feasibility report of various projects proposed around Gangtok including the Geo technical and feasibility report of Old West Point School area where the project in question is proposed to be constructed.

A True copy of Letter bearing Memo No. 84/SPV/GSCDL/2018-19dated 23.11.2019 from Office of the Gangtok, Smart City development Limited, Sokaythang, Gangtok, East Sikkim marked and appended as **ANNEXURE R/2**.

2.4. That thereafter, the answering Respondent accordingly, during the month of February 2020 to March 2020,with the expertise of the technical team of the Department, has carried out a comprehensive Geological and Geo-technical investigation of the site at Old West Point School area near M.G. Marg, Gangtok, East Sikkim bythe methodology of Diamond Core Drilling and prepared a detailedGeological and Geo-Technical Investigation Report of the same with a conclusion and recommendation as under:-

1. "*Geologically, the area comprises of medium to high grade metamorphic rock sequence represented by Garnetiferrous Mica schist and Mica schist with quartzite intercalations underlain by Lingtse Granitic Gneiss. The foliation of rocks strike NW-SE and dip gently towards North east with Westerly facing slope aspect which makes the area geologically favourable for proposed construction of structures at Old West Point School area.*

2. *Based on the drilling data of Borehole no. 01 light brown clayey /silty soil is encountered from 3.00m depth, Garnetiferrous Mica Schist with quartz veins is found from 3.00m to 9.00m depth followed by Moderately weathered Garnetiferrous Mica Schist between 9.00m to 13.00m depth underlain by highly weathered Garnetiferrous Mica Schist between 13.00m to 15.00m depth.*

3. *For Borehole no. 02 micaceous silty soil overburden can be encountered upto depth of 3.00m followed by highly weathered Garnetiferrous Mica Schist between 3.00m to 6.00m depth.Further,Garnetiferrous Mica Schist with quartz veins between 6.00m depth to 9.00m depth followed by fresh Garnetiferrous Mica Schist with quartz veins between 9.00m to 10.50m depth.Moderately weathered Garnetiferrous Mica Schist can be encountered between 10.50m to 13.50 m depth followed by moderately weathered Garnetiferrous Mica Schist and fresh Garnetiferrous Mica Schist.*

4. *The tensile strength of rock core for Borehole no. 01 of depth 10.50 m is 70.10 T/m^2 and 12 m depth is 115.20 T/m^2 and compressive strength is 121.00 T/m^2 & 96.00 T/m^2 whereas tensile strength of rock core for Borehole no.02 of depth 9 m is 331.20 T/m^2 and compressive strength is 345.60 T/m^2.The low value of strength of the rock is due to high degrees of weathering and nature of flaky micaceous rock. However, strength of the strata greater than 35 T/m^2 in hilly terrain is recommended for construction as per IS CODE.*

5. *As Garnetiferrous Mica Schist is a foliated and becomes non-competent metamorphic rock when contacted continuously with water activity in which incidences of differential settlement is a natural phenomenon under such condition. Therefore, suitable foundation design to be designed by a competent structural engineer based on the sub-surface geological condition of rock strata.The Safe bearing capacity for Bh. 01 at depth of 1.50 m is 13.84 T/M^2 and 3..0m depth is 20.15 T/M^2 and SBC for Bh. 02 at depth of 1.50m is 6.92 T/m^2,3.00m depth is 11.51T/m^2 and 4.50m depth is 46.50T/m^2."*

True copy of the detailed Geological and Geo-Technical Investigation Report dated March 2020of the land proposed for the construction of various structures at Old West Point School, Gangtok East Sikkim marked and appended as **ANNEXURE R/3.**

2.5. That on 06.12.2021 the answering Respondent received a letter bearing Ref. no. MIPL/HO/18/2021-22 dated 21.09.2021 from MESASO Infrastructure Private Limited submitted along with the letter for Appointment of Concessionaire for implementation of the Multi-level car parking cum Commercial development at Old West Point School Area, Gangtok issued from the Office of Gangtok Smart City Development Limited bearing Memo No. 197/GSCDL/2021-22 dated 30.06.2021, requesting for issuance of a Stability Report of Old West Point School area near M.G. Marg, Gangtok, East Sikkim for implementation of Multi-Level Car Parking cum Commercial Development. True copy of the Letter bearing Ref. no. MIPL/HO/18/2021-22 dated 21.09.2021 from MESASO Infrastructure Private Limitedis marked and appended as **ANNEXURE R/4** and a True copy of the Letter for Appointment of Concessionaire for implementation of the Multi-level car parking cum Commercial development at Old West Point School Area, Gangtok issued from the Office of Gangtok Smart City Development Limited bearing Memo No. 197/GSCDL/2021-22 dated 30.06.2021is marked and appended as **ANNEXURE R/5.**

2.6. That after due verification of the documents submitted by the MESASO Infrastructure Private Limited, the answering Respondent conducted a detailed investigation of the site at Old West Point School, Gangtok East Sikkim and has subsequently provided a Site Stability report of the same which states that the said site falls within Zone 1 (one) of areal Stability Zonation Mapping System adopted by the Department of Mines and Geology, Government of Sikkim considering the physical features, geological setup and underlying strata, orientations of rocks, soil bearing capacity, strength of rock, surrounding built up area and the slope of the site at Old West Point School, Gangtok East Sikkim under the present conditions.

2.7. That it is important to submit that the soil in the area at Old West Point School, Gangtok, East Sikkim has a soil bearing capacity of 46.50 $T/m^{2.}$ at 4.5-meter depth as estimated according to the IS Code 6403- 1981. The soil bearing capacity in the said area is greater than 35 T/m^2 which is

notified and recommended for zone 1 (one). Further, the orientation of the country rock is towards the North East direction whereas slope facing towards west direction makes the area geologically favorable for the proposed construction.

2.8. That the answering Respondent has also further recommended vide the abovementioned Site Stability Report dated 29.12.2021 that the foundation of the structure should be footed at considerable depth with uniform condition and has also recommended to consult a competent structural engineer for appropriate foundation design of the structures including earthquake resilience. It has also been suggested with a noting that *"the proposed area falls under zone 1 (one) as per the parameter notified by the Department of Mines and Geology vide Gazette no. 86 dated 06th April 2021.*True copy of the Site Stability Report dated 29.12.2021 is marked and appended as **ANNEXURE R/6.**

2.9. That it is also important to submit that the answering Respondent has also carried out a detailed Geological and Geo-Technical investigation of the surrounding areas within Gangtok, East Sikkim in the past. One such study has been carried out in the year 2011 wherein a Multi-Storied Secretariat Building has been constructed in the area that falls under zone one, and till date no settlement or any damages have been reported. The said area has geological conditions and rock type which are similar to the proposed area at Old West Point School complex. True copy of the 2011 detailed report of the Geological and Geo-Technical investigation of the surrounding areas within Gangtok, East Sikkim is marked and appended as **ANNEXURE R/7.**

3. REPLY OF THE RESPONDENT NO. 3, DEPARTMENT OF MINES AND GEOLOGY, GOVERNMENT OF SIKKIM TO THE CONTENTIONS MADE BY THE APPLICANT AGAINST THE RESPONDENT NO. 3

3.1. That it is alleged by the Original Applicant that the answering Respondent has given permission for construction of 14 storeys building without taking into account the Notification dated 19.03.2021 issued by the Department of Mines and Geology, Government of Sikkim. That

such an allegation is false, misleading and wrong and is explained in detail in the subsequent paragraphs.

3.2. That it is pertinent to mention herein that the answering Respondent discharges its functions as illustrated below:-

a) Geological & Geo-technical study and Mapping of major towns of Sikkim.
b) Establishment of rock and soil mechanics Laboratory with computers for data processing.
c) Establishment of Geological Museum.
d) Development of Dikchu Mine.
e) Physico-chemical and bacteriological study of perennial sources of water all over the State.
f) Establishment and promotion of dolomite / limestone calcinations plant.
g) Promotion of locally available rocks as dimension stones.
h) Carry out mineral exploration and develop local mineral resources into viable income / employment generating schemes (dolomite / Limestone calcinations).

3.3. That it is humbly submitted that during high intensity earthquake, the intensity of damage is based upon the characteristic of the slope forming materials. The slope consisting of rock strata are less amplified than the slope having soil thickness which is more amplified during high intensity earthquake. Hence, damage will be more in the soil thickness area than the area having rock strata. The proposed area consists of mica schist rock at the foundation level.

3.4. That the proposed area in question has had no record of any landslides till date. It is reiterated that during the geological investigation it was found that the area falls under the metamorphic rock sequence represented in the area by mica schist with alternate bends Granetiferous mica schist with quartz veins having direction of foliation of rock towards Northeast direction whereas slope facing towards western direction makes the area geologically favorable.

3.5. That as far as the contention of the Applicant that Arithang ward consisting of Gneissic rock and Schistose rocks are highly weathered and eroded due to high rainfall causing frequent landslides is concerned, it is humbly submitted that the weathering of rock due to rainfall is restricted only to the rock surface because rain water will immediately run off after rainfall. Therefore, deep weathering in the rock by high intensity rainfall in hilly areas are negligible. Further, as per the 2018Report published by the Sikkim Disaster Management Authority, Land Revenue and Disaster Management Department, Government of Sikkim titled "Multi Hazard Risks and Vulnerability Assessment of Gangtok, Municipal Corporation, East Sikkim" the proposed area is comparatively less susceptible to earthquake hazards in the entire Arithang ward. The said area in Arithang is characterized by gentle slope gradient with sandy soil upto 3 m depth followed by parent soil/weathered rock having soil bearing capacity of 45.50 T/m^2as per IS Code 6403-1981 which has comparatively high soil bearing capacity. The down slope of the Arithang is characterized by medium to high grade metamorphic rock sequence represented in the area by Lingtse granitic gneiss inter band with mica schist. The Lingtse granitic gneiss is the comparatively the most competent and bears a high compressive rock strength within the State of Sikkim. Therefore, the majority of the Arithang area is free from landslide zone except few locations where surfacial erosion has been occurring during high intensity rainfall due to dumping of muck materials at the time of individual house construction and along jhora section.

3.6. That it is humbly submitted that the monitoring and construction work is not within the ambit of the answering Respondent. Moreover, the photographs appended in the Original Application are not of the site of the proposed construction of the Multi-level car parking cum Commercial development at Old West Point School Area, Gangtok and as such the Original Application deserves to be dismissed for suppression of material and misleading this Hon'ble Tribunal.

3.7. That the Notification dated 19.03.2021 has been issued by the Department of Mines and Geology, Government of Sikkim is issued in continuation of the prior Notification No. GOS/UD&HD/6(294)2001/A dated 16.10.2001 issued by the UD&HD Department, Government of Sikkim.

3.8. That the opening word of the Notification dated 19.03.2021 issued by the Department of Mines and Geology, Government of Sikkim runs as:-

"In continuation with Notification no. GOS/UD&HD/6(294)2001/A dated16.10.2001) and gazette no. 387 dated 16/10/2001 which notified that the maximum height of building constructed in allotted sites or private holdings within a notified area shall be in accordance with the suitability and profile of the locations based on the stability map of the area as prepared by Mines and Geology Department from time to time which shall be as follows:"

3.9. That Clause 2(a) sub clause (i) of Notification No. GOS/UD&HD/6(294)2001/A dated 16.10.2001 issued by the UD&HD Department, Government of Sikkim runs as:-

"(i) The maximum height of building constructed in allotted sites or private holdings within a notified area shall be in accordance with the suitability and profile of the locations based on the stability map of the area as prepared by Mines and Geology Department from time to time which shall be as follows:

Stability Zone	*Admissible no. of floors*
1.	*$5^{1/2}$ storeys*
2.	*$4^{1/2}$ storeys*
3.	*$3^{1/2}$ storeys*
4.	*$2^{1/2}$ storeys*
5.	*$1^{1/2}$ storeys*
6.	*No construction is allowed"*

3.10. That now addressing the pointas stated by the original Applicant that the answering Respondent has granted permission for construction of a 14 storey building without taking into account its Notification dated 19.03.2021 issued by Department of Mines and Geology, Government of Sikkim, it is imperative to bring to the knowledge of the Hon'ble Tribunal that the said Notification dated 19.03.2021 issued by the answering Respondent is only meant to notify and create awareness among the mass on the stability condition of land. The said Notification has to be seen in its totality of the Act under which such Notifications/Rules/Orders are issued.

3.11. That it is submitted that the main objective of the said Notification dated 19.03.2021 issued by Department of Mines and Geology, Government of Sikkim is to set out parameters for determination of stability zones of each zone. In other words, it means that as to what are the parameters that are required for zonation of each land. The said Notification also provides that the said parameters are known as site stability zonation parameters and have to be strictly followed during categorization of zones.

3.12. That the answering Respondent has notified vide Notification dated 19.03.2021, the parameters required for the purpose of categorization of zones of each land which may be noted as below:-

Zone 1

Rock Properties:	Bed rock/parent soil is expected at foundation depth. Unweathered/surfacial weathering, compact with no joint spacing, moderate to high compressive strength, high frictional resistance.
Built up area:	Training of jhoras/drains have been completed and done properly (with safe distance)
Overburden:	Thin to medium thick having good bearing capacity of soil.
Bearing Capacity:	> 35 T/m^2

Ground Water Activity:	Low
Relation Between Natural Slope And Rock Bed/Foliation:	Favourable, >30°
Adverse Geo-Environment:	Nil
Upslope pressure:	Nil
Vibration Impact:	Minimum
Slope:	Gentle to moderate. <15°
Depth of soil:	<3m
Relative relief:	<100m
Hydrological conditions:	Dry/nil
Category:	Suitable after taking appropriate measures to slope/precautionary and preventive measures at the time of foundation leveling.
Zone 2	
Rock Properties:	Bed rock/parent soil is not expected at foundation level. weathering on surface of contact zone is suspected, medium to high compressive strength, jointed rocks with minimum spacing, joint plane undulating with high frictional resistance.
Built up area:	Training jhora/drain was done but not properly maintained.
Overburden:	Medium thick (rock expected at considerable depth)
Bearing Capacity:	15-35 T/m^2
Ground Water Activity:	Low to medium
Relation Between Natural Slope And Rock Bed/Foliation:	Favourable,20-30°
Adverse Geo-Environment:	Nil.

Upslope pressure:	Suspected
Slope:	Gentle to moderate, 16-25°
Upslope pressure:	Nil
Vibration Impact:	Minimum
Depth of soil:	3-8 metres
Relative relief:	101-300 metres
Hydrological conditions:	Damp
Category:	Suitable after taking proper surface/sub-surface drainage system.

Zone 3

Rock Properties:	Bed rock/parent soil is not expected at foundation level. Weathering on surface of contact zone is suspected, low to medium compressive strength, jointed rocks with minimum spacing, and joint plane smooth with low frictional resistance.
Built-up area:	Jhora training is required/annual maintenance of drain is necessary.
Overburden:	Thick soil overburden, having moderate to low soil bearing capacity.
Bearing capacity:	<15 T/m^2
Ground Water Activity:	Medium to high
Relation Between Natural Slope And Rock Bed/Foliation:	Rock dips at some angle to direction of slope, <20°
Adverse Geo-Environment:	Rocks are subjected to folding, fracturing & weathering.
Slope:	Moderate to high. slope which reflects the competency of slope forming materials 26-35°

Upslope pressure:	Suspected.
Vibration Impact:	Low to medium
Depth of soil:	>8m
Relative relief:	>300m
Hydrological conditions:	Wet
Category:	Suitable after taking various geotechnical corrective measures.

Zone 4

Rock Properties:	Bed rock/parent soil is beyond foundation level. high degree of weathering is suspected, low compressive strength, jointed rocks, joint plane smooth with low frictional resistance
Built up area:	Untrained jhora/ erosional potential jhora
Overburden:	Medium thick to thick soil overburden
Bearing capacity:	<10 T/m^2
Ground Water Activity:	Higher water regime.
Relation Between Natural Slope And Rock Bed/Foliation:	Slightly adverse to adverse.
Adverse Geo-Environment:	Gully erosion & collapse of jhora facing slopes at isolated places, formation of cracks or fissures on the ground. Creep movement suspected.
Slope:	Steep, 36-45°
Upslope pressure:	Suspected.
Vibration Impact:	Low to medium
Depth of soil:	>8m
Relative relief:	>300m
Hydrological conditions:	Dripping
Category:	Not suitable for habitation unless immediate protective

measures to safeguard upslope/ minimise further degradation of stability condition of upslope area.

Zone 5

Rock Type:	Bed rock/parent soil is beyond foundation level. high degree of weathering is suspected, low compressive strength, jointed rocks, joint plane smooth with low frictional resistance
Built up area:	Nil
Overburden:	Thick with low soil bearing capacity.
Bearing capacity:	<10 T/m^2
Ground Water Activity:	High.
Relation Between Natural Slope And Rock Bed/Foliation	Slightly adverse to adverse.
Adverse Geo-Environment:	Area subjected to isolated slope failure, creep movement widespread, wide cracks on ground.
Slope:	high to steep slope, >45°
Upslope pressure:	Present.
Vibration Impact:	Medium
Depth of soil:	>10m
Relative relief:	>300m
Hydrological conditions:	Flowing
Category:	Area not suitable needs immediate protective measures to protect upslope area.

Zone 6

Rock Type:	Bed rock/parent soil is beyond foundation level. high degree of weathering is suspected, very low

	compressive strength, jointed rocks, joint plane smooth with low frictional resistance
Built up area:	Nil
Overburden:	Thick with low soil bearing capacity.
Bearing Capacity:	<5 T/m^2
Ground Water Activity:	High.
Relation Between Natural Slope And Rock Bed/Foliation:	Adverse.
Adverse Geo-Environment:	Incidences of slope failure, gully erosion, adverse slope facing towards jhora section etc.
Slope:	High slope >45°
Upslope pressure:	Present.
Vibration Impact:	medium
Depth of soil:	>10m
Relative relief:	>300m
Hydrological conditions:	Flowing
Category:	Area not suitable needs immediate protection for arresting further aggravation of instability problems.

3.13. That vide above said Notification No17/DMG/20-21 dated 19.03.2021, issued by the Department of Mines and Geology, Government of Sikkim, the said Respondentis empowered to upgrade the land stability zonation for a particular site if the pre-requisite condition is fulfilled. The phrase runs as under: -

"Further, the department will be reviewing the zonation ratings on the following conditions.

Conditions and pre-requisite for review of site stability report/up-gradation of Land Stability Zonation for particular site.

1. *Recommendation suggested in site stability report should be adopted during construction of structures.*

2. *Training of untrained Jhora and maintenance at regular intervals which is located adjacent to the plot.*

3. *Construction of structure below the building which was barren before which also aids in improving the stability of the upslope area. Further, construction of building in the downslope area also acts a retaining/protective wall for the houses located in the upslope area.*

4. *Minimum of three (03) years after the completion of house construction so as to observe the incidences of differential settlement as per the IS Code of Practice for calculation of settlements of foundations (IS Code:- 8009(Part 1)-1978(Reaffirmed 2003)). The review of the rating on zonation can be done.*

5. *Proper channelization of surface runoff by providing catchment drains especially during the rainy seasons and connect it to natural waterways/Jhora which also improves the stability of the area due to reduced erosions and percolation of water in the slope concerned.*

6. *Any site improvement activities/works like grouting/micro-pilling/retaining works/rock bolting/anchoring/shot creting works as per site requirement has been done in the area which will re-strengthen the stability condition shall be entertained for review of stability zonation rating."*

3.14. That it is submitted before this Hon'ble Tribunal that the proviso given in the Notification No.GOS/UD&HD/6(294)2001/A dated 16.10.2001 issued by the UD&HD Department, Government of Sikkim provides the power of the State Government for relaxing the applicability of the provisions contained in the above Notification, which runs as under:-

"39 Power to relax

In case of genuine difficulties arises out of the implementation of any of the regulations in regard to building or structures proposed to be constructed by the Government of Sikkim or Government of India or any registered organization of the state Government reserves right to relax from application any of the provisions which it considered justifiable on the merit of each case".

That it is for the competent authority to respond to the relaxation given in view of the dire need of the parking facility required in the said area. However, it is believed that the said project was submitted to the highest office of the State and thereafter the same has been approved by the Cabinet, which clearly shows that Regulation 39 has been adhered to, while granting such exemption.

True copy of the Notification No. GOS/UD&HD/6(294)2001/A dated 16.10.2001 issued by the UD&HD Department, Government of Sikkim has been annexed as Annexure R/1 above and the True copy of the Notification No.17/DMG/20-21 dated 19.03.2021 issued by the Department of Mines and Geology, Government of Sikkim is marked and appended as **ANNEXURE R/8.**

3.15. That it is humbly submitted before this Hon'ble Tribunal that the answering Respondent has carried out the Geological and Geo-Technical Investigation at the said site and has provided the Geological and Geo-Technical Investigation Report and has also provided a Site Stability Report in view of the letters received from the office of Respondent No. 2, Gangtok Smart City Development Limited, Sokaythang, Gangtok, East Sikkim under the signature of its Nodal Officer and from M/s MESASO Infrastructure Private Limited respectively.

3.16. That the Project Proponent, M/s Mesaso Infrastructure Private Ltd, has submitted a certificate issued by Jadavpur University certifying that the load of the proposed structure is 21 T/m^2 which is less than the soil bearing capacity in the area and the load of the structure is confined within the construction area. In light of the aforesaid, the answering Respondent has communicated to the Project Proponent vide Letter dated 17.02.2022 that the suggestion in the Site Stability Report regarding the load impact assessment of the surrounding area is not required. True copy of the Letter dated 17.02.2022 issued by the Department of Mines & Geology to M/s Mesaso Infrastructure Private Ltd is marked and appended as **ANNEXURE R/9.**

3.17. That the remaining contentions made out against the answering Respondent in the Original Application are false and misconceived and hence are not tenable in law as well as facts and same is not responded individually for sake of brevity.

PRAYER

In view of the position of facts and law and the submissions made herein above, it is most respectfully prayed that this Hon'ble Tribunal may kindly be pleased to dismiss the Application in the facts and circumstances stated above. Further, the Answering Respondent No. 3 craves the leave of this Hon'ble Tribunal to add, amend or alter this reply, if found necessary, at any stage of the proceedings. The Answering Respondent also craves leave of this Hon'ble Tribunal to make further submissions at the appropriate stage, if so advised.

DEPONENT

VERIFICATION

I, the above-named deponent do hereby verify and say that the statements made at aforementioned paragraphs of the Counter affidavit is true to my knowledge rest are my respectful submissions before this Hon'ble Tribunal. The documents filed herewith as annexures are true copies of respective originals.

Affirmed on this the 25th day of February 2022 at Gangtok, East Sikkim.

DEPONENT

Identified by:

(Yadev Sharma)
Govt. Advocate
Gangtok, E-Sikkim.

Solemnly affirmed before me on this 25th day of Feb/2022 by Shri/Smt/Miss. Soman Ongden Lepcha of Gangtok who is known to me & identified by Shri/Smt/Miss. Yadav Sharma of Gangtok

Mr Sujan Sunwar
Oath Commissioner (East)
High Court of Sikkim
Vide Notification No. 38/HCS /30.09.21

ANNEXURE-R/1

GOVERNMENT OF S1KIK1M
URBAN DEVELOPMENT AND HOUSING DEPARTMENT
GANGTOK

No.GOS/UD&HD/6 (294)2001 Dated:16/10/2001

NOTIFICATION

In exercise of the powers conferred by Sub-section (2) of section 7 and section 17 of the Sikkim Allotment of House Sites and Construction of Building (Regulation and Control) Act, 1985 (11 of 1985), the State Government hereby makes the following regulations further to amend the Sikkim Building Construction Regulations, 1991, namely:-

(1) (1)These Regulations may be called the Sikkim Building Construction (Amendment) Regulations, 2001.

(2) They shall extend to all the notified areas in Sikkim.

(3) They shall come into force at once.

(4) They shall apply to both Government allotted sites and private sites.

(2) In the Sikkim Building Construction Regulation, 1991, (hereinafter referred o as the said regulations), in regulation 17, -

(a) for sub-re9ulation (I), the following shall be substituted, namely:-

"(i) The maximum height of buildings constructed in allotted sites or private holdings within a notified area shall be in accordance with the suitability and profile of the locations based on the stability map o the area as prepared by the Mines and Geology Department from time to time which shall be as follows: -

Stability zone	Admissible number of floors
1.	5 ½ storeys
2.	1 ½ storeys
3.	3 ½ storeys
4.	2 ½ storeys
5.	1 ½ storeys
6.	No construction is allowed.

Provided that the height of buildings shall be regulated in accordance with the size of the plot allotted or possessed and structural design of the foundation of the proposed building;
(b) after sub-regulation (V) the following sub regulation shall be added, namely: -

"(vi) Any structure beyond the permissible number of floors or allotted area or approved Blue print Plan completed or under construction on or before the date of notification of these regulations, shall be regularized after payment of regularization fee to be prescribed by Notification by the Government.

3. In the said regulation, after regulation 38, the following regulation shall be inserted, namely:-

39 Power to relax — In case of genuine difficulties arising out of the implementation of any of the regulations in regard to buildings or structures proposed to be constructed by the Government of Sikkim or Government of India or any registered organization the State Government reserves the right to relax from application of any o the provisions which it considers justifiable on the merit of each case."

Commissioner –cum- Secretary
Urban Development & Housing Department.

-TRUE COPY-

ANNEXURE-R/2

GANGTOK SMART CITY
DEVELOPMENT LTD

GANGTOK SMART CITY DEVELOPMENT LIMITED
LEVEL 5, KISAN BAZAAR, LAL MARKET ROAD,
GANGTOK – 737101, SIKKIM, INDIA
CIN – U93090WB2017SGC223807

Memo no: - 84/SPV/GSCDL/2018-19 Dated: - 23/11/2019

To,

The Secretary,
Mines & Geology Department,
Government of Sikkim,

Sub: - Geological & Geo-technical Investigation at Old West Point School Area

Sir,

The undersigned has been directed to inform your good office that Gangtok Smart City Dev. Ltd. is implementing the project **"Multi-Level Car Parking cum commercial development at Old West Point School Area".** In this regard, it is requested that geological & geo-technical investigation of the project area may be carried out by your department.

In view of the above, the letter is submitted for further n.a, please.

23/11/2019.

Nodal Officer
Gangtok Smart City Dev. Ltd.

NODAL OFFICER
GANGTOK SMART CITY DEV. LTD.
GANGTOK, EAST SIKKIM

-TRUE COPY-

ANNEXURE-R/3

Geological and Geo-Technical investigation report of the land proposed for the construction of various structures at Old West Point, School, Gangtok, East-Sikkim

DEPARTMENT OF MINES AND GEOLOGY
GOVT. OF SIKKIM
GANGTOK
MARCH 2020

CONTENTS:-

1. INTRODUCTION.
2. GEOLOGY OF THE AREA.
3. SITE GEOLOGY.
4. GEO-TECHNICAL INVESTIGATION.
5. ROCK QUALITY DESIGNATION.
6. CONCLUSIONS AND RECOMMENDATIONS.
7. ANNEXURE I
8. ANNEXURE II
9. ANNEXURE III
10. ANNEXURE IV
11. GEOLOGICAL MAP OF THE AREA
12. LOCATION MAP OF BOREHOLES DRILLED IN THE AREA

INTRODUCTION

Apropos to letter No. 84/SPV/GSCDL/2018-19 dated 23/11/2019 from Nodal Officer, Gangtok Smart City Development Limited, Gangtok requisition for geological and geo-technical investigation of the land at old STNM complex Gangtok, east Sikkim. Accordingly, a team of Geologists along with technical team from the Department of Mines and Geology, Government of Sikkim conducted a detail Geo-technical investigation by means of diamond core drilling of the area proposed for the construction of various structures at Old West Point School, Gangtok, East Sikkim from February 2020 to March 2020.

Geographically the proposed area is located between N27°19.46' latitude and E88°36.59' longitude at an elevation of 1720 m amsl. The proposed area is located adjacent to Pakyong Main line Taxi stand at Gangtok, East Sikkim.

GEOLOGY OF THE AREA

Sikkim-Darjeeling Himalayas are Techno-stratigraphically defined by four domains with characteristic stratigraphic and structural attributes. From south to north they are:

i. Foot hill belt

ii. Inner Belt

iii. Axial Belt and

iv. Trans-Axial Belt.

The state is mostly covered by Precambrian metamorphites of low to medium grade (Daling Group), high grade gneisses (Darjeeling Gneiss and Kanchendzonga Gneiss), Chungthang Formation (quartzite, calc-silicate rocks, marbles, graphite schist's and occasionally amphibolites) with intrusive granites (Lingtse granite gneiss) and Phanerezoic rocks including Gondwana and Tethyan sedimentary. The Paleozoic and Mesozoic (Tethyan) sequence in the northern and north-western part of Sikkim are fossiliferous.

The Gondwana super Group consists of sandstone, shale and carbonaceous shale with occasional thin bands of coal and pebbly shale horizon.
Daling group of rocks can be classified into three formations:
a. Gorubathan Formation: characterized by quartz-chloride-sericiteschists, phyllite and quartzite's.

b. Reyang Formation: characterized by quartzite's (occasionally calcareous), phylliteinterbanded with carbonaceous slate.

c. Buxa Formation: characterized by presence of dolomitic limestone occasionally interbanded with phyllite and development of organo sedimentary structure (stromatolites).

The Kanchendzonga Gneiss comprises mainly high-grade gneiss The Chungthang gneiss is a quartz-biotite gneiss.A streaky sheared granite gneiss known as "Lingtse Gneiss" occur as a NE-SW to N-S trending strip of rocks and forms a general line of separation between the Daling and high grade Kanchendzonga Gneiss.The Tethyansedimentaries, exposed in the northern part of Sikkim represent Everest Phyllite series (shale's/phyllite), Mount Everest Limestone series, Lachi Formation (conglomerate with thick diamictite base) and TsoLhamo Formation (calcareous shale, limestone band, calcareous sandstone).

Site Geology

Geologically, the proposed area falls within medium to high grade metamorphic rock formation represented in the area by Garnetiferrous Mica Schist and mica schist with quartzite intercalations underlain by a streaky sheared Lingtse Granitic Gneiss. The foliation of the rock strikes NW-SE and dip gently towards North East. The area has moderate to gentle slope gradient with westerly facing slope aspect. The area in consideration has medium to thick soil overburden with low groundwater activity.

GEO-TECHNICAL INVESTIGATION

Diamond drilling is a form of core drilling which uses a rotary drill with a diamond drill bit mounted to a core barrel which is then connected to the drill stem with barrels of various lengths.In this method the movement of drilling is vertically down,the drill bit cuts the rock in a rotatory manner and accordingly rock cores are retrieved in the core barrel from various depths.

Accordingly, two number of boreholes were drilled at Old West Point School Complex which is located adjacent to the Pakyong Main Line Taxi stand,Gangtok,East Sikkim. Bore hole no. 01 **(Geographical coordinates-E 27° 19'47.96" latitude N 88° 36'39.77" longitude, elevation 1606m)** was drilled in front of Old West Point School building a upto 15 m depth. Following type of sub-surface strata is present as per the samples recovered during the drilling i.e. light brown clayey /silty soil is encountered from 3.00m depth, Garnetiferrous Mica Schist with quartz veins is found from 3.00m to 9.00m depth followed by Moderately weathered Garnetiferrous Mica Schist between 9.00m to 13.00m depth underlain by highly weathered Garnetiferrous Mica Schist between 13.00m to 15.00m depth.The photo of the core box containing rock samples from various depth in given below in Photo 01.

Photo 01:-core box showing recovered core samples from various depth of Bore hole no.01.

Borehole number 02 (**Geographical coordinates-E 27° 19'48.19" latitude N 88° 36'38.92" longitude, elevation 1604m**) was drilled behind Old West Point School building upto depth of 15 m. micaceous silty soil overburden can be encountered upto depth of 3.00m followed by highly weathered Garnetiferrous Mica Schist between 3.00m to 6.00m depth.Following strata is present as per the drilling data i.e. Garnetiferrous Mica Schist with quartz veins between 6.00m depth to 9.00m depth followed by fresh Garnetiferrous Mica Schist with quartz veins between 9.00m to 10.50m depth.Moderately weathered Garnetiferrous Mica Schist can be encountered between 10.50m to 13.50 m depth followed by moderately weathered Garnetiferrous Mica Schist and fresh Garnetiferrous Mica Schist. The photo of the core box is shown below.The details of logging of the Boreholes are provided in the enclosed Drill Log Data Sheets.(Annexure I & II)

Photo 02:-core box showing recovered core samples from various depth of Bore hole no.02.

Accordingly, Standard Penetration Test (SPT) were also carried out simultaneously along with drilling in the area. Six numbers of SPT were performed

and the Safe bearing pressure of the soil samples are as under (details provided in Annexure I & II)

Borehole no.01 (Front of Old West Point School building)

Rock (depth 10.50m) i) Brazilian (Tensile strength 70.10 T/m²)

ii) Point load (Compressive strength 115.20 T/m²)

(depth 12.00m) iii) Brazilian (Tensile strength 121.00 T/m²)

iv) Point load (Compressive strength 96.00 T/m²)

Soil i) Depth 1.50 m - 13.84 T/m²

ii) Depth 3.00 m - 20.15 T/m²

Borehole no.02 (Behind Old West Point School building)

Rock (depth 9.00 m) i) Brazilian (Tensile strength 331.20 T/m²)

ii) Point load (Compressive strength 345.60 T/m²)

Soil i) Depth 1.50 m - 6.92 T/ m²

ii) Depth 3.00 m - 11.51 T/m²

iii)Depth 4.50 m - 46.50 T/m²

Rock Quality Designation (RQD)

Rock Quality Designation is a measure of quality of rock core taken from a borehole. RQD signifies the degree of jointing or fracture in a rock mass measured in percentage where RQD of 75% or more shows good quality rocks and less than 50% shows low quality weathered rocks.

Bore hole no. 01

Depth - 0.00m to 1.50m

Lithology – Light brown clayey soil.

Weathering – N.A.

RQD- N.A.

Quality of rock – N.A.

Depth - 1.50m to 3.00m

Lithology – Light brown silty soil.

Weathering – N.A.

RQD- N.A.

Quality of rock – N.A

Depth - 3.00m to 9.00m

Lithology – Garnetiferrous Mica schist with quartz viens.

Weathering – highly weathered.

RQD- < 25%

Quality of rock – Very Poor quality.

Depth - 9.00m to 13.00m

Lithology – Garnetiferrous Mica schist.

Weathering – Moderately weathered.

RQD- > 50%

Quality of rock – Good quality

Depth - 13.00m to 15.00m

Lithology – Garnetiferrous Mica schist.

Weathering – Highly weathered.

RQD- < 25%

Quality of rock – Very poor quality

Borehole no. 02

Depth - 0.00m to 3.00m

Lithology – Micaceous silty soil.

Weathering – N.A.

RQD- N.A.

Quality of rock – N.A.

Depth - 3.00m to 6.00m

Lithology – Garnetiferrous Mica Schist.

Weathering – Highly weathered.

RQD- <25%

Quality of rock – Very poor quality.

Depth - 6.00m to 9.00m

Lithology – Garnetiferrous Mica schist with quartz veins.

Weathering – highly weathered.

RQD- <25%.

Quality of rock – Very poor quality.

Depth - 9.00m to 12.00m

Lithology – Garnetiferrous Mica schist.

Weathering – very low weathering.

RQD- >50%

Quality of rock – Good quality.

Depth - 12.00m to 15.00m

Lithology – Garnetiferrous Mica Schist.

Weathering – low weathering.

RQD- >50%

Quality of rock – Good quality.

Conclusions and recommendations.

1. Geologically, the area comprises of medium to high grade metamorphic rock sequence represented by Garnetiferrous Mica schist and Mica schist with quartzite intercalations underlain by Lingtse Granitic Gneiss. The foliation of rocks strike NW-SE and dip gently towards North east with Westerly facing slope aspect which makes the area geologically favourable for proposed construction of structures at Old West Point School area.
2. Based on the drilling data of Borehole no. 01 light brown clayey /silty soil is encountered from 3.00m depth, Garnetiferrous Mica Schist with quartz veins is found from 3.00m to 9.00m depth followed by Moderately weathered Garnetiferrous Mica Schist between 9.00m to 13.00m depth underlain by highly weathered Garnetiferrous Mica Schist between 13.00m to 15.00m depth.
3. For Borehole no. 02 micaceous silty soil overburden can be encountered upto depth of 3.00m followed by highly weathered Garnetiferrous Mica Schist between 3.00m to 6.00m depth.Further Garnetiferrous Mica Schist with quartz veins between 6.00m depth to 9.00m depth followed by fresh Garnetiferrous Mica Schist with quartz veins between 9.00m to 10.50m depth.Moderately weathered Garnetiferrous Mica Schist can be encountered between 10.50m to 13.50 m depth followed by moderately weathered Garnetiferrous Mica Schist and fresh Garnetiferrous Mica Schist.
4. The tensile strength of rock core for Borehole no. 01 of depth 10.50 m is 70.10 T/m^2 and 12 m depth is 115.20 T/m^2 and compressive strength is 121.00 T/m^2 & 96.00 T/m^2 whereas tensile strength of rock core for Borehole no.02 of depth 9 m is 331.20 T/m^2 and compressive strength is 345.60 T/m^2.The low value of strength of the rock is due to high degrees of weathering and nature of flaky micaceous rock. However, strength of the strata greater than 35 T/m^2 in hilly terrain is recommended for construction as per IS CODE.
5. As Garnetiferrous Mica Schist is a foliated and becomes non-competent metamorphic rock when contact continuously with water activity in which incidences of differential settlement is a natural phenomenon under such condition. Therefore, suitable foundation design to be designed by a competent structural engineer based on the sub-surface geological condition of rock strata.

6. The Safe bearing capacity for Bh. 01 at depth of 1.50 m is 13.84 T/M^2 and 3..0m depth is 20.15 T/M^2 and SBC for Bh. 02 at depth of 1.50m is 6.92 T/m^2,3.00m depth is 11.51T/m^2 and 4.50m depth is 46.50T/m^2.

Annexure I

DRILL LOG DATA SHEET

Name of Project : Geo Technical Investigation of the land proposed for construction of various structure at Old West Point School.

SITE : Old West Point School Complex, Gangtok, East Sikkim (Front of the school building)

DRILLING EQUIPMENT: Diamond core drilling with double tube barrel

Co-ordinates: E 27° 19'47.96" latitude N 88° 36'39.77" longitude

DRILLING METHOD: Rotary

DRILLING DIAMETER/ CASING DIAMTER NX Size BX,NX Size

R.L.(m): 1606m

DRILL HOLE NO: 03

ORIENTATION: Vertical down

Date	From (in m)	To (in m)	Total Run	Drilling log	Core recovery length(m)	Core recovery %	Water loss	Core no.(length in cm)	RQD	Strength(T/M²)	SPT N-Value	LITHOLOGY
31/01/2020	0.00	1.50	1.50		0	0%	No loss	-	-	13.84	16	Light brown clayey soil.
1/02/2020	1.50	3.00	1.50		0	0%	No loss	-	-	20.15	18	Light brown silty soil.
1/02/2020	3.00	4.50	1.50		0.10	6%	No loss	1(3)	<25%	-	core	Garnetiferrous Mica Schist with quartz viens.
2/02/2020	4.50	6.00	1.50		0.15	10%	No loss	2(4)	<25%	-	core	Garnetiferrous Mica Schist with quartz viens
2/02/2020	6.00	7.50	1.50		0.10	6%	No loss	3(1.3)	<25%	-	core	Garnetiferrous Mica Schist with quartz viens
3/02/2020	7.50	9.00	1.50		0.40	26%	No loss	4(2.8),5(1.5),6(2),7(1.8),8(4),9(1.3),10(1.5),11(5)	>50%	-	core	Garnetiferrous Mica Schist with quartz viens
3/02/2020	9.00	10.50	1.50		1.10	73%	100%	12(4.7),13(4.5),14(6),15(6.4),16(6.2),17(9.8),18(10.5),19(4.6),20(18.2),21(5.5),22(17)	>50%	70.10T/m² & 115.20T/m²	core	Moderately weathered Garnetiferrous Mica Schist.
4/02/2020	10.50	12.00	1.50		0.77	51%	100%	23(4.5),24(6),25(5),26(4.3),27(7.5),28(21.5),29(3.2)	>50%	121.00T/m² & 96.00 /m²	core	Moderately weathered Garnetiferrous Mica Schist
5/02/2020	12.00	13.00	1.00		0.80	80%	100%	30(3.7),31(11.2),32(1.9),33(3.5),34(3.9),35(6.3),36(6.5),37(6.4),38(2.4),39(8.6),40(3.3)	<25%	-	core	Moderately weathered Garnetiferrous Mica Schist
7/02/2020	13.00	14.00	1.00		0.50	50%	100%	41(3.7),42(2.4)	<25%	-	core	Highly weathered Garnetiferrous Mica Schist
7/02/2020	14.00	15.00	1.00		0.55	55%	100%	43(2.8)	<25%	-	core	Highly weathered Garnetiferrous Mica Schist

ANNEXURE II

DRILL LOG DATA SHEET

Name of Project : Geo Technical Investigation of the land proposed for construction of various structures at Old West Point School.

SITE : Old West Point School Complex, Gangtok, East Sikkim. (Behind School Building)

DRILLING EQUIPMENT: Diamond core drilling with double tube barrel

Co-ordinates: E 27° 19'48.19" latitude N 88° 36'38.92" longitude,

DRILLING METHOD: Rotary

DRILLING DIAMETER/ CASING DIAMTER NX Size BX,NX Size

R.L.(m): elevation 1604m

DRILL HOLE NO: 04

ORIENTATION: Vertical down

Date	From (in m)	To (in m)	Total Run	Drilling log	Core recovery length(m)	Core recovery %	Water loss	Core no.(length in cm)	RQD	Strength(T/M²)	SPT N-Value	LITHOLOGY
10/02/2020	0.00	1.50	1.50		0	0%	No loss	-	-	6.92	8	Micaceous silty soil.
11/02/2020	1.50	3.00	1.50		0	0%	No loss	-	-	11.51	10	Micaceous silty soil.
11/02/2020	3.00	4.50	1.50		0	0%	No loss	-	<25%	46.50	28	Highly weathered Garnetiferrous Mica Schist.
11/02/2020	4.50	6.00	1.50		0	0%	No loss	-	<25%	-	-	Highly weathered Garnetiferrous Mica Schist.
12/02/2020	6.00	7.50	1.50		0	0%	100%	-	<25%	-	core	Garnetiferrous Mica schist with quarts veins.
13/02/2020	7.50	9.00	1.50		0.60	40%	100%	1(9.4),2(6.2),3(4.4)	<25%	331.20T/m² & 345.60 T /m²	core	Garnetiferrous Mica schist with quarts veins
13/02/2020	9.00	10.50	1.50		0.80	53%	100%	4(9.3),5(6.2),6(3),7(3.6),8(2.5),9(4.5),10(1.6),11(5.2),12(5.4)	>50%	-	core	Fresh Garnetiferrous Mica Schist with quarts veins.
14/02/2020	10.50	12.00	1.50		0.43	28%	100%	13(7),14(6.9),15(11),16(4.7)	>50%	-	core	Fresh Garnetiferrous Mica Schist with quarts veins.
15/02/2020	12.00	13.50	1.50		0.50	33%	100%	17(3.8),18(4),19(1.3),20(2.5),21(3),22(4.3)	<50%	-	core	Moderately weathered Garnetiferrous mica schist.
16/02/2020	13.50	15.00	1.50		0.40	26%	100%	-	>50%	-	core	Moderately weathered Garnetiferrous mica schist underlain by fresh Garnetiferrous mica schist.

(Annexure III)

Point Load Test

Location of sample: Old West Point School, Gangtok, East Sikkim

Date of Test: 13.03.2020

Rock type – Garnetiferrous Mica Schist

Point Load = $q_t = 0.96 \times p/D^2$ IS:8764-1978

Sample No.	Depth (in m)	D, Diameter	Load (KN)	q_t
BH 01	9.00m	5 cm	9 KN	345.60T/m^2
BH 02	10.5m	5 cm	3 KN	115.20T/m^2
BH 02	12.0m	5 cm	2.5KN	96.00T/m^2

Brazilian Test

Location of sample – Old West Point School, Gangtok, East Sikkim
Date of test – 13.03.2020
Rock type - Garnetiferrous Mica Schist

Tensile Strength = $q_t = 2p/\pi DL$

P = Load (KN)
D = Diameter of core sample (cm)
L = Length of core sample(cm)

IS:10082- 1981

Sample No.	Depth (in m)	D= Diameter (cm)	L=Length(cm)	P=Pressure (KN)	T/m^2
BH 01	9.00	5	10	26	331.20T/m^2
BH 01	10.5	5	10	5.5	70.10T/m^2
BH 02	13.5	5	10	9.5	121.00 T/m^2

(ANNEXURE IV)

Field Photos

Photos:- Diamond core drilling of Borehole number 01 in progress in front of Old West Point School building at Gangtok,East Sikkim.

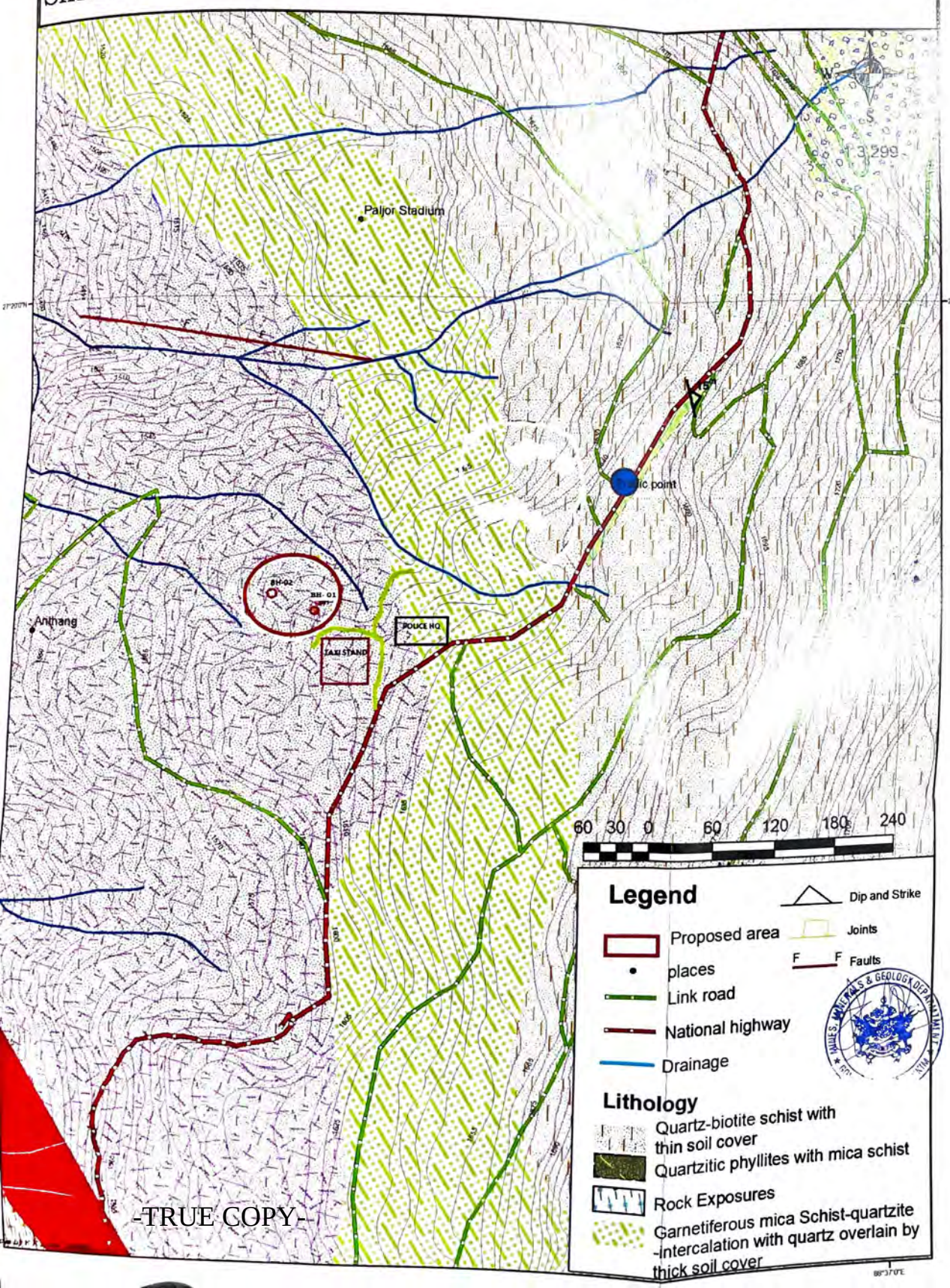
Photos:- Diamond core drilling of Borehole number 02 behind Old West Point School building at Gangtok, East Sikkim

MINES, MINERALS & GEOLOGY DEPARTMENT

LOCATION MAP OF BOREHOLES AT OLD WEST POINT SCHOOL,EAST SIKKIM

40

GENERAL GEOLOGICAL/LITHOLOGICAL MAP OF OLD WEST POINT SCHOOL(BELOW MAINLINE TAXI STAND),GANGTOK,EAST SIKKIM.



-TRUE COPY-

ANNEXURE-R/4

Ref. No. MIPL/HO/18/2021-22

Date: 21.09.2021

To,
The Principal Secretary
Mines & Geology Department,
Gangtok,
East Sikkim, Sikkim 737101

Sub.: Request letter for issue of Stability report for Implementation of Multi-Level Car Parking cum Commercial Development at Old West Point School, Near M.G. Marg, Gangtok, East Sikkim

Ref.: Appointment Letter vide Memo No. 197/GSCDL/2020-21; Dated 30/06/2021

Dear Sir,

With reference to the above subject matter, MESASO Infrastructure Private Limited is appointed as concessionaire for "Implementation of Multi-Level Car Parking cum Commercial Development at Old West Point School, Near M.G. Marg, Gangtok, East Sikkim".

We hereby request you to kindly issue a stability report.

Thanking You.

Yours Faithfully,

For, MESASO Infrastructure Private Limited

(Authorised Signatory)

MESASO Infrastructure Private Limited Siliguri

Mines & Geology Dept. Govt. of Sikkim

Received on 06/12/21

MESASO Infrastructure Private Limited, 3rd Floor, Vega Circle Mall, 3rd Mile, Sevoke Road, Siliguri, West Bengal - 734001 | info@mesaso.in | + 91 9907311645
CIN: U45309WB2021PTC243031 | PAN: AAOCM2843E | GSTIN: 11AAOCM2843E1ZQ

-TRUE COPY-

ANNEXURE-R/5

File No:106/GSCDL/2019

GANGTOK SMART CITY DEVELOPMENT LTD

Gangtok Smart City Development Limited,
5th Floor Kissan Bazar, Lal Bazar Road,
Gangtok, Sikkim – 737101
E Mail – gangtoksmartcity@gmail.com
CIN – U9309090WB2017SGC223807

Memo No:...197...../GSCDL/2021-22 Dated: 30/06/ 2021

To,

MESASO Infrastructure Pvt Ltd.,
3rd Mile, Sevoke Road
Siliguri- 734008

Subject: Appointment of Concessionaire for implementation of Multi level car parking cum commercial development at Old West Point School Area, Gangtok

Sir,

With Reference to Concession agreement entered between Gangtok Smart City Development Limited and MESASO Infrastructure Private Limited; Dated 29.06.2021, we have hereby appointed you as a concessionaire for "Implementation of Multi level car parking cum commercial development at Old West Point School Area, Gangtok" on Design, Built, Finance, Operate and Transfer (DBFOT) basis under PPP mode.

Thanking You,

Yours sincerely,

Chief Executive Officer
Gangtok Smart City Development Limited.

Chief Executive Officer
Gangtok Smart City Development Ltd.
Tadong, Gangtok-737102

-TRUE COPY-

ANNEXURE-R/6

DEPARTMENT OF MINES & GEOLOGY
GOVERNMENT OF SIKKIM

***Ref.No*:F.1/62 (3)DM&G/21-22/478** **Date:.29.12.21**
Challan No:33300/Sl. No:138545

Site Stability Report

Reference: - Applicant's Letter. Dated:29.12.2021

1. **(i) Name of Applicant-** M/S Mesaso Infrastructure Pvt. Ltd. (Authorized vide Memo no. 197/GSCDL/2021-22 dated 30.06.2021).

   (ii) Name of Land owner- Secretary, UD & HD, Government of Sikkim.

2. **Location of Site-** Old West point school Complex, Gangtok, East Sikkim

3. **Location (with reference to prominent Structure within area and physical features with appropriate distance & direction)-** 10 meters SW of the Police Headquarter at Gangtok, East Sikkim land bearing plot no.683/P,715,716 under Gangtok Revenue Block, East Sikkim.

4. **Bounded by-** East: Road Leading to Primula lodge.
   West: Footpath
   North: Footpath
   South: Footpath

5. **Physical features**

a) Slope- Gentle.

b) Drainage system – No erosion potential Jhora present nearby plot.

c) Status of structure in the vicinity – No adverse situation presents at the time of inspection.

6. **Geological setup**

a) Type & condition of Lithology – The area comprises of medium grade metamorphic rock sequence represented in the area by mica schist with and without quartz veins overlain by medium thick to thin soil cover.

b) Fractures / Faults / Weathering- Surfacial weathering.

c) Overburden – Medium thick to thin soil cover.

d) Dip of bed rock – Favourably oriented.

e) Ground water activities – Low surface/sub-surface water regime.

f) Nature of contact zone of rock & overburden materials – Undulating surface with high frictional resistance is expected.

g) Other geo-features – No any other adverse geological features were observed at the time of inspection.

7. **Conclusion** – Falls within Zone one (1) of areal Stability Zonation Mapping System adopted by department of Mines & Geology.

8. Recommendation – The foundation of the structures should be footed at considerable depth with uniform condition, also consult a competent structural engineer for appropriate foundation design of the structures including earthquake resilience.

Further,

1. The proposed area falls under zone one (1) as per the parameters notified by the department of Mines and Geology vide Gazette no.86 dated 06th April 2021. However as Sikkim lies over young fold mountains, seismic zone IV and with fragile geological condition micro seismic studies in the area and load impact assessment of the surrounding areas, to be carried out prior to construction of multi-storied structures and provide suitable mitigation measures, if required, to avoid future complications.

Joint Director(Geology)
Mines & Geology Department
Government of Sikkim,
Gangtok

Mines & Geology

-TRUE COPY-

Senior Geologist
Deptt of Mines & Geology
Govt of Sikkim
Gangtok

GEOLOGICAL AND GEO-TECHNICAL APPRAISAL OF TASHILING SECRETARIAT COMPLEX, POST 9/18

SIKKIM EARHTQUAKE – 2011

MINES MINERALS AND GEOLOGY DEPARTMENT
GOVERNMENT OF SIKKIM.

18TH OCTOBER -2011

Contents

1. Report
2. Drill log Data Sheets
3. Photographs of sites & core samples
4. Geo-technical laboratory test reports annexure

   Annexure I

   Direct Shear Test, Sieve Analysis Report, Density and Moisture content (SP1, Depth 12'-14')

   Annexure II

   Direct Shear Test, Sieve Analysis Report, Density and Moisture content (SP1, Depth 14'-15')

   Annexure III

   Direct Shear Test, Sieve Analysis Report, Density and Moisture content (SP2, Depth 08'-09')

   Annexure IV

   Brazilian Test Report of Bore hole point 1, core No.6.

   Annexure V

   Brazilian Test Report of Bore hole point 2, core No.1.

   Annexure VI

   Point Load Test Report of Bore hole point 2, core No.2.

   Annexure VII

   Determination of Safe Bearing Capacity of Soil report on Sample point No.1&2

5. Geological Section along N-S direction (Section X-Y).
6. Geological Section along E-W direction (Section A-B).
7. Geological Section along E-W direction (Section P-Q).
8. Geological Map of Tashiling Secretariat area(1:2000 Scale)
9. Slope analysis and Stability Assessment map of Tashiling Secretariat Area (1:1,500 scale).
10. Contour Map of the Tashiling Secretariat Area

GEOLOGICAL & GEO-TECHNICAL APPRAISAL OF TASHILING SECRETARIAT COMPLEX, GANGTOK.

INTRODUCTION

The earthquake that rattled the State of Sikkim on the evening of 18th Sept. 2011 was of the magnitude of 6.9 on Richter scale with its epicenter at 27.74° latitude and 88.113° longitude at a depth of 19.7 km (IMD). It had a devastating effect in the State and surrounding areas causing massive loss of lives and property. Many of the private as well as Govt. buildings were damaged irreparably and the heart of administrative centre, the Secretariat and its surrounding buildings at Tashiling Gangtok were also not spared of its wrath. Since these buildings were rendered unsafe, the offices housed in these buildings were shifted elsewhere. With a view to ascertain suitability of the site for the re-construction of the secretariat and other office buildings at Tashiling, the Hon'ble Chief Minister inspected the Tashiling area alongwith a team of Secretaries, HODs and technical experts on 11.10.2011. After a detailed inspection of the area, the HCM desired that a new Secretariat building needs to be constructed to house all the offices. He then directed the Department of Mines, Minerals & Geology to give a report within a week on feasibility of constructing a new Secretariat, building at Tashiling with regard to the stability and utilization aspect of the area for formulation of future plan of action. He desired that the area required for utilization as office space needs to be around 10 lakh sq. ft. to accommodate present as well as future needs of all the State Govt. departments.

As per the direction of the HCM the Department of Mines, Minerals & Geology decided to take up following works:

a. Geological investigation of the area.
b. Core drilling on the Secretariat complex for geotechnical studies.
c. Contour surveying of the area and mapping.
d. Soil sampling

The department started the work on geological studies and contour survey from 12.10.11. The drilling machine which was being used at Sangacholing, Pelling, was shifted to Tashiling on a war footing and the core drilling was started from 14.10.11.

OBJECTIVE & SCOPE OF INVESTIGATION

Sikkim Himalayas fall under zone IV of Seismic Zonation rating as per the Indian Seismic Code IS 1893 – 2002. Sikkim Himalayas are a part of tectonic mountain chain formed by collision of Indian Plate with Urasian Plate. As a result rocks are thrusted, folded, faulted and highly fractured. The area has not yet attained the slope stability condition and slope modification processes are active with the triggering factors such as high rainfall, seismic tremors etc. On preliminarily examination, one of the causes of damage is suspected to be the anomalies on geological characteristics of foundation over which Secretariat was built. In such scenario, geological and geo-technical investigation is a basic tool in designing appropriate infrastructural facilities considering all the natural adversaries. Thus the site selection with suitability/stability, availability of required area with feedback/data generation for safe design is the main objective of investigation.

In the prevailing geological condition with all natural adversaries and urgency, detail geo-technical investigation for design propose is time consuming and unachievable in short period of time. The scope of present investigation is limited to identification of suitable/ stable area for formulation of opinion in future course of action by the State Authorities. Present investigation is aimed at identifying the suitability of the area based on :-

I Geological Mapping of Area :

Characterization of strength of rocks on general characteristics of rocks.

Testing of major rock samples for arriving at safe assumption of load bearing capacity of area.

Analyses of soil samples collected from depth ranging from 15 – 25 ft from selected places.

Topographic survey for slope analyses and demarcation of suitable area for construction.

Preparation of geological sections for revealing overburden and different rock formation at various depth.

II Geological setup of area :

Geological mapping of 65,72,000 sq ft. of areas covering Tashiling Secretariat & Palace gate on the north, Palace guest house ridge on the east, Army water supply pipe line on the south Deorali-Dukipandokan road (Namnam Assambly Complex, Annex Buildings upto Duki Pan Dokan) in south –west, west and north west. The three distinct rock types viz- Lingtse granitic gneiss, micaschist, quartzite and highly sheared/weathered micaceous rocks are the main rock formation of the area overlain by shallow to moderately thick soil overburden. The trend of foliation plane are NNE-SSW dipping North-East. The general characteristics of rocks are as follows:-

i) Lingtse Granitic Gneiss : These rocks form the basal part of area under consideration characterized by joint massive rocks with band of mica schist in the middle part. The mica schist band is clubbed with the lingtse granitic gneiss band. Rocks are hard and brittle and weathering along joint plane is noticed. In rock mass characteristic, these rocks are considered to be grade I & II. Since the rocks are jointed, block failure at places is common. However, these rocks have contributed to the overall stability of Gangtok area.

ii) Micaceous Quartzite : Two bands of micaceas rocks with Lintse Granitic Gneiss in between are mapped within the Tashiling Secretariat Complex. Micaceous Quartzite bands show high compressive strength with surface weathering. They are free from jointing and characterized as grade I & II depending upon the composition and weathering. These rocks are also not adverse to overall stability of area. However, Lingtse granitic gneiss are subjected to jointing and capable joints extend from junction point of Secretariat main block and VIP block to Roro chhu, trending SE. In upper part i.e. between NW part of Press building to Secretariat, a wedge block of rock has dislocated and the void filled by soil. The main cause of distress on VIP block was caused due to in-homogeneity and infirmities of foundation condition. If such surface data was available prior to construction, appropriate technique would have prevented the irreparable damage.

iii) Mica Schist : These rocks are highly sheared, jointed and weathered. The compressive strength is poor than the soil. In between a fault with displacement of approx. 30 cm has been mapped during the investigation with down through towards Palace guest house. However the extension of this fault couldn't be traced on down the slope. These rocks extend upto Nehru point on ridge area on the north and widespread on western flank (Radio station area, Sichey area) and eastern flank towards Tathangchen area. However area is mapped upto Palace Gate only.

III **<u>Geotechnical Investigation</u>** :

Three bore holes are drilled in front of Tashiling Secretariat and 8 holes for soil analysis have been carried out between Annexe building and Tashiling Secretariat. The average bearing capacity based on test results of various rocks and soil samples are as under (details provided in annexure 1 to 5).

a) Rock (depth 8 mts. to 9.5 mts.) - i) Brazillian (Tensile strength 356 tons/m2)

ii) Point Load (Compressive strength 238 tons/m2)

b) Soil i) Depth 2.4 mts. - 159 tons/m2

ii) Depth 4.2 mts. - 173.7 tons/m2

Slope analyses of Approx. 10,61,700 sq. feet has been covered on 1:1000 scale contour map. Based on slope analyses the area has been divided into

a)	Gentle slope	(0^{o} to 10^{o})	- 11.51 %	- 1,22,200 sq. ft.
b)	Moderate sloe	(11^{o} to 20^{o})	- 8.67%	- 92,100 sq. ft.
c)	Moderately gentle slope	(21^{o} to 30^{o})	- 28.71%	- 3,04,800 sq. ft.
d)	Moderately steep slope	(31^{o} to 40^{o})	- 13.69%	- 1,44,900 sq. ft.
e)	Steep slope	(> 40^{o})	- 37.46%	- 3,97,700 sq. ft.

CONCLUSION & RECOMMENDATION

1. Stability zonation: Based on geological & geotechnical parameters test and generalized characteristics of rocks and soil, as well as, slope condition, the stability of area has been categorized. Since, the overall area falls within stable zone, suitability is based on slope condition.

   The percentage distribution of areas are as under :

a. Suitable area for construction of 3 to 4 storied building (inclusive of existing building in the area) < 30^{o} slope - 48% - 5,19,200 sq. ft.

b. Area suitable for other purpose 30^{o} to 40^{o} - 13.69% - 1,44,900 sq. ft.

c. Unsuitable area (mainly based on slope condition) > 40^{o} - 37.46% - 3,97,700 sq. ft.

2. For general planning purpose, average 4 storied buildings are recommended. However detailed geotechnical parameters will govern the individual planning of structures in the area. In areas with sound stability condition, the number of floors may be decided as per the bearing capacity of rock and soil.

3. **The identified area of infirmities and in-homogeneity needs consolidation and grouting to obtain the characteristics of rocks.**

4. **During construction stage, rock / soil from foundation level is required to be tested and to maintain uniformity of foundation condition, consolidation and grouting of each column is recommended for safety of structures.**

5. Geological surprises are common in such geological conditions and remedial measures can be formulated at **construction stage** only. Advice of geologist and experts plays a **critical** role.

Drill Log Data Sheet

Mines, Minerals & Geology Department

Government Of Sikkim

Gangtok.

SITE: Tashiling Secretariat, East Sikkim.							JOB NO.: 01		
DRILLING EQUIPMENT: Diamond drilling with Single tube barrel									
DRILLING METHOD: Rotary		**DRILLING DIAMETER**: BX,NX Size					**CASHING DIAMETER**: NX Size		
DRILL HOLE NO.: 01						**SHEET NO.:** 01	R.L. (m): 1720m amsl		
ORIENTATION: Vertical down						**CO-ORDINATE: N27^0 19.48", E 88^0 36'.42"**			
DETAILS OF SAMPLES:						**DETAILS OF DRILL HOLE:**			
RUN (mts.)		**Depth (in mts.)**	**Log**	**Type of sample**	**Core Recov-ery**	**Core Loss**	**Water loss**	**Allowable bearing capacity/ Rock Strength**	**Rock Type**
From	**To**			**in(mts.)**	**(%)**	**(%)**			
0.00	1.50	1.50		Core	7.33%	92.67%	No loss		Filling Materials
1.50	3.00	1.50		slush	00.00%	100.00%	No Loss		Filling Materials
3.00	4.50	1.50		Core	8.66%	91.64%	loss		Filling Materials
4.50	5.00	0.50		Slush	0.00%	100.67%	Loss		Filling Materials
5.00	6.50	1.50		Slush	00.00%	100.00%	loss		Filling Materials
6.50	8.00	1.50		slush	00.00%	100.00%	loss		Lingtse Granetic Gneiss
8.00	9.50	1.50		Core	8.66%	91.67%	loss	254.7T/m^2	Lingtse Granetic Gneiss
9.50	11.00	1.50		Slush	0.00%	100.00%	loss		Casing Block
11.00	12.50	1.50					loss		Casing Block
12.50	14.00	1.50					loss		Casing Block

Drill Log Data Sheet

Mines, Minerals & Geology Department

Government Of Sikkim

Gangtok.

SITE: Tashiling Secretariat, East Sikkim.								JOB NO.: 02	
DRILLING EQUIPMENT: Diamond drilling with Single tube barrel									
DRILLING METHOD: Rotary		**DRILLING DIAMETER**: BX,NX Size						**CASHING DIAMETER**: NX Size	
DRILL HOLE NO.: 02						**SHEET NO.:** 01		R.L. (m): 1720m amsl	
ORIENTATION: Vertical down						**CO-ORDINATE: N27^0 19.48", E 88^0 36'.47"**			
DETAILS OF SAMPLES:						**DETAILS OF DRILL HOLE:**			
RUN (mts.)		**Depth (in mts.)**	**Log**	**Type of sample**	**Core Recov-ery**	**Core Loss**	**Water loss**	**Allowable bearing capacity/ Rock Strength**	**Rock Type**
From	**To**			**in(mts.)**	**(%)**	**(%)**			
0.00	1.50	1.50		slush	0.00%	100.00%	loss		Filling Materials
1.50	3.00	1.50		slush	00.00%	100.00%	Loss		Filling Materials
3.00	4.50	1.50		Core	3.66%	96.64%	No loss		Mica Schist
4.50	6.00	1.50		core	24.00%	76.00%	No Loss	356.6T/m^2 238T/m^2	Lingtse Granetic Gneiss

Drilling on Progress at Tashiling Secretariat

Soil Sampling on progress at Western slope of Tashiling Secretariat

Facture plane (Wedge Failure in In-situ rock formation) towards South West of Present Secretariat.

Drilling on progress

Recoveries of core at drill point no 2.

Annexure I

Geo - Technical Laboratory
Mines, Minerals & Geology Department
Government Of Sikkim
Gangtok.

Direct Shear Test Report

Location of Sample: Below Secretariat building
Sample Point: No.1
Date of test: 17/10/2011
Depth: 12' - 14'

IS = 72720

Sl. No.	Strain	Load(kg)	Load(kg)	Load(kg)
		Proving ring reading	Proving ring reading	Proving ring reading
		0.357kg	**0.714kg**	**1.06kg**
1	50	10.00	25.00	22.00
2	100	19.00	35.00	33.00
3	150	25.00	43.00	40.00
4	200	29.00	49.00	45.00
5	250	32.00	53.00	50.00
6	300	37.00	57.00	54.00
7	350	39.00	59.00	57.00
8	400	40.00	60.00	59.00
9	450	43.00	61.00	61.00
10	500			62.00
11	550			63.00
12	600			64.00
13	650			
14	700			
15	800			

A_c = 36cm², Ac_1= 30.60 cm², Ac_2= 30.60cm², Ac_3= 28.80 cm²

$Load_1$=0.20 kn, $Load_2$= 0.29 kn, $Load_3$= 0.30 kn

Shear Stress (Ss) = Load/Area

Ss_1 = 0.65 kg/cm² = 6.50 t/m²
Ss_2 = 0.95 kg/cm² = 9.50 t/m²
Ss_3 = 1.04 kg/cm² = 10.40 t/m²

Average Allowable Shear Stress as per direct Shear Test = 8.80 t/m²

Annexure I

Geo- Technical Laboratory
Mines, Minerals &Geology Department
Government Of Sikkim
Gangtok

Sieve Analysis Report

Location of Sample **Below Secretariat building**
Sample Point No. 1
Date of test **17/10/2011**
Depth **12' - 14'**

I.S=1498-1970

IS sieves sizes (mm)	wt.of retained sample(gms)	Sample retained (%)	Sample passing (%)
4.75	21.74	21.74	78.03
2.36	14.61	14.61	63.42
1.18	13.94	13.94	49.48
0.600	10.05	10.05	39.43
0.425	4.98	4.98	34.45
0.300	7.76	7.76	26.69
0.150	17.64	17.64	9.05
0.075	6.42	6.42	2.63
Pan	2.63	2.63	0.00

Gravel (%)=21.74 **very coarse sand(%)=14.61** **coarse sand (%)=13.94** **Medium grained sand(%)=15.03**

Fine to very fine sand(%)=25.40 **Silt(%)=6.42** **Clay(%)=2.63**

Moisture content(%) =7.84 **Soil density =1.70g/cm^3.**

Annexure II

Geo - Technical Laboratory
Mines, Minerals & Geology Department
Government Of Sikkim
Gangtok.

Direct Shear Test Report

Location of Sample: Below Secretariat building
Sample Point No.: 1
Date of test: 17/10/2011
Depth: 14' - 15'

IS = 72720

Sl. No.	Strain	Load(kg) Proving ring reading 0.357kg	Load(kg) Proving ring reading 0.714kg	Load(kg) Proving ring reading 1.06kg
1	50	14.00	8.00	20.00
2	100	26.00	17.00	27.00
3	150	30.00	25.00	36.00
4	200	39.00	32.00	41.00
5	250	44.00	38.00	45.00
6	300	48.00	44.00	50.00
7	350	51.00	50.00	53.00
8	400	53.00	53.00	56.00
9	450	55.00	55.00	59.00
10	500	56.00	58.00	62.00
11	550		59.00	64.00
12	600		60.00	66.00
13	650			67.00
14	700			68.00
15	800			

A_c = 36cm² **Ac_1= 29.88 cm^2** **Ac_2= 28.80cm^2** **Ac_3= 27.72 cm^2**

$Load_1$=0.27 kn **$Load_2$= 0.28 kn** **$Load_3$= 0.32 kn**

Shear Stress (Ss) = Load/Area

Ss_1 = 0.90kg/cm² = 9.00 t/m^2

Ss_2 = 0.97 kg/cm² = 9.70 t/m^2

Ss_3 = 1.15 kg/cm² = 11.50 t/m^2

Average Allowable Shear Stress as per direct Shear Test = 10.07 t/m^2

Beyond this depth bed rock is encountered

Annexure II

Geo- Technical Laboratory
Mines, Minerals &Geology Department
Government Of Sikkim
Gangtok

Sieve Analysis Report

Location of Sample	**Below Secretariat building**
Sample Point No.	2
Date of test	**17/10/2011**
Depth	**8' - 9'**

I.S=1498-1970

IS sieves sizes (mm)	wt.of retained sample(gms)	Sample retained (%)	Sample passing (%)
4.75	58.93	58.93	41.01
2.36	8.53	8.53	32.48
1.18	7.64	7.64	24.84
0.600	5.49	5.49	19.35
0.425	2.59	2.59	16.76
0.300	3.93	3.93	12.83
0.150	8.39	8.39	4.44
0.075	3.17	3.17	1.27
Pan	1.27	1.27	0.00

Gravel (%)=58.93 **very coarse sand(%)=8.53** **coarse sand (%)=7.64** **Medium grained sand(%)=8.08**

Fine to very fine sand(%)=12.32 **Silt(%)=3.17** **Clay(%)=1.27**

Moisture content(%) =7.18 **Soil density =1.30g/cm^3.**

Annexure III

Geo - Technical Laboratory
Mines, Minerals & Geology Department
Government Of Sikkim
Gangtok.

Direct Shear Test Report

Location of Sample	Below Secretariat building
Sample Point No.	2
Date of test	17/10/2011
Depth	8' - 9'

IS = 72720

Sl. No.	Strain	Load(kg) Proving ring reading 0.357kg	Load(kg) Proving ring reading 0.714kg	Load(kg) Proving ring reading 1.06kg
1	50	14.00	21.00	24.00
2	100	25.00	30.00	34.00
3	150	32.00	37.00	42.00
4	200	38.00	43.00	47.00
5	250	42.00	47.00	51.00
6	300	46.00	51.00	55.00
7	350	49.00	54.00	59.00
8	400	52.00	56.00	64.00
9	450	54.00	59.00	67.00
10	500	56.00	61.00	
11	550	57.00		
12	600	58.00		
13	650			
14	700			
15	800			

A_c = 36cm²

Ac_1= 28.80 cm^2 **Ac_2= 29.88cm^2** **Ac_3= 30.60 cm^2**

$Load_1$=0.27 kn **$Load_2$= 0.29kn** **$Load_3$= 0.32 kn**

Shear Stress (Ss) = Load/Area

Ss_1 = 0.94 kg/cm² = 9.40 t/m^2

Ss_2 = 0.97 kg/cm² = 9.70 t/m^2

Ss_3 = 1.05 kg/cm² = 10.50 t/m^2

Average Allowable Shear Stress as per direct Shear Test = 9.87 t/m^2

Beyond this depth bed rock is encountered

Annexure III

Geo- Technical Laboratory
Mines, Minerals &Geology Department
Government Of Sikkim
Gangtok

Sieve Analysis Report

Location of Sample **Below Secretariat building**
Sample Point No. 2
Date of test **17/10/2011**
Depth **8' - 9'**

I.S=1498-1970

IS sieves sizes (mm)	wt.of retained sample(gms)	Sample retained (%)	Sample passing (%)
4.75	58.93	58.93	41.01
2.36	8.53	8.53	32.48
1.18	7.64	7.64	24.84
0.600	5.49	5.49	19.35
0.425	2.59	2.59	16.76
0.300	3.93	3.93	12.83
0.150	8.39	8.39	4.44
0.075	3.17	3.17	1.27
Pan	1.27	1.27	0.00

Gravel (%)=58.93 **very coarse sand(%)=8.53** **coarse sand (%)=7.64** **Medium grained sand(%)=8.08**

Fine to very fine sand(%)=12.32 **Silt(%)=3.17** **Clay(%)=1.27**

Moisture content(%) =7.18 **Soil density =1.30g/cm^3.**

Annexure IV

Geo - Technical Laboratory
Mines, Minerals & Geology Department
Government Of Sikkim
Gangtok.

Brazillian Test Report

Location of Sample: In front of Secretariat building
Date of Test: 17/10/2011

Tensile Strength = $q_t = 2p/\pi DT$
P = Load (Kn)
D = Dia of core sample (cm)
T=Thickness of core sample(cm)
Bore hole point No. 1

IS:10082- 1981

Core No.	D= Diameter (cm)	T=Thickness(cm)	P=Pressure (Kn)	t/m^2
6	5	5	9.5	254.7 t/m^2

Rock Type Lingtse Granetic Gneiss
Rock Strength 254.7 T/m^2

Annexure V

Geo - Technical Laboratory
Mines, Minerals & Geology Department
Government Of Sikkim
Gangtok.

Brazillian Test Report

Location of Sample: In front of Secretariat building
Date of Test: 17/10/2011

Tensile Strength = $q_t = 2p/\pi DT$
P = Load (Kn)
D = Dia of core sample (cm)
T=Thickness of core sample(cm)
Bore hole point No. 2

IS:10082- 1981

Core No.	D= Diameter (cm)	T=Thickness(cm)	P=Pressure (Kn)	t/m^2
1	5	5	14	356.6 t/m^2

Rock Type Lingtse Granetic Gneiss
Rock Strength 356.6 T/m^2

Annexure VI

Geo - Technical Laboratory
Mines, Minerals & Geology Department
Government Of Sikkim
Gangtok.

Point Load Test Report

Location of Sample: In front of Secretariat building
Date of Test: 17/10/2011

Compressive Strength = $q_t = 0.96 \times p / D^2$
P = Load (Kn)
D = Dia of core sample (cm)
Bore hole point No. 2

Core No.	D= Diameter (cm)	P=Pressure (Kn)	t/m^2
1	5	6.2	238 t/m^2

Rock Type **Lingtse Granetic Gneiss**
Rock Strength **238 T/m^2**

GOVERNMENT OF SIKKIM
DEPARTMENT OF MINES, MINERALS & GEOLOGY
GANGTOK

IS-6403: 1981

Sample point No.	Sample collection depth	Foundation type used during calculation	Value of Shear strength(C)	Phi(ϕ)	γ	Factor of safety	SBC	SBC
1	14'-15'	Square	1.65 T/M^2	49^0	1.39 g/cm^3	5	17.37 kg/cm^2	173.7 T/M^2
2	08'-09'	Square	1.45 T/M^2	49^0	1.30 g/cm^3	5	15.901kg/cm^2	159.01 T/M^2

SBC=Safe Bearing Capacity

Annexure VII

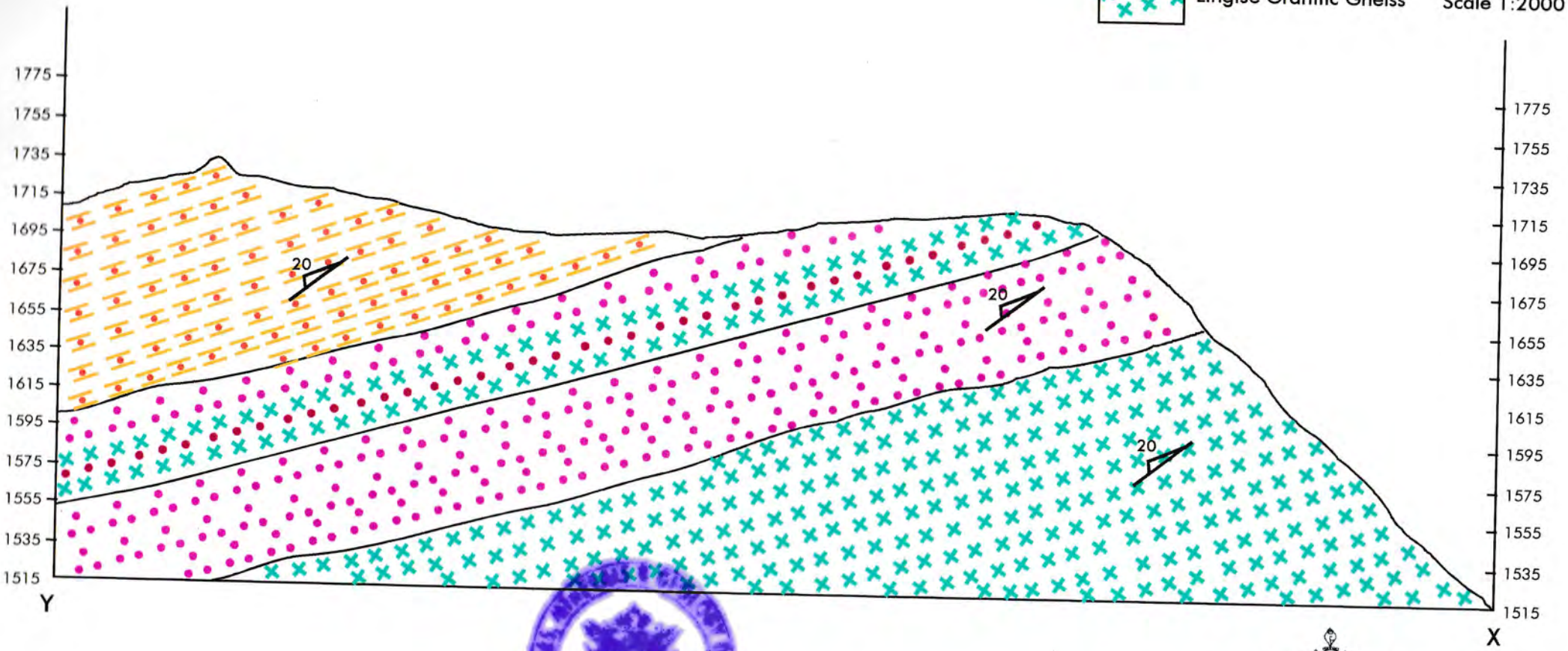
GEOLOGICAL SECTION ALONG NORTH - SOUTH DIRECTION (X- Y)

LEGEND

- Highly Weathered Mica Schist
- Quartizitic Mica Schist
- Thick Soil Cover
- Lingtse Granitic Gneiss

N

Scale 1:2000



DEPARTMENT OF MINES, MINERALS & GEOLOGY

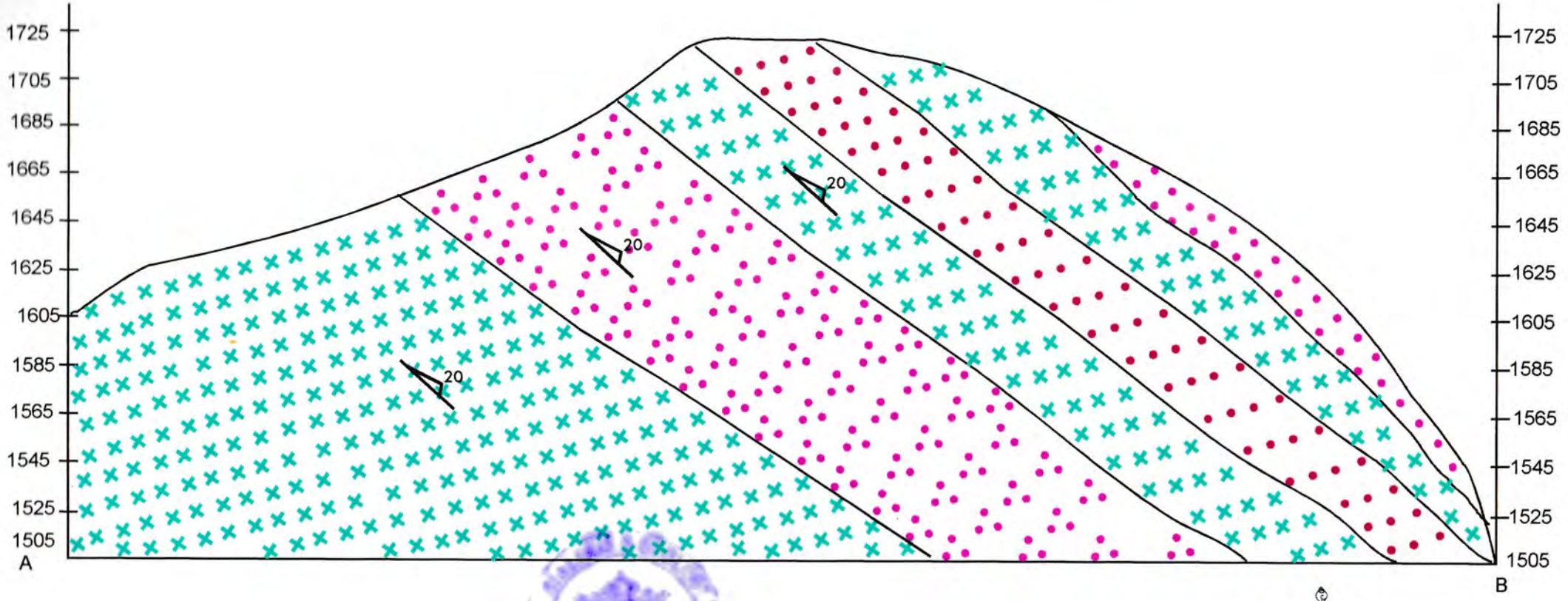
GEOLOGICAL SECTION ALONG NORTH - SOUTH DIRECTION (A- B)

LEGEND

- Quartizitic Mica Schist
- Thick Soil Cover
- Lingtse Granitic Gneiss

N

Scale 1:2000



DEPARTMENT OF MINES, MINERALS & GEOLOGY
GOVERNMENT OF SIKKIM

GEOLOGICAL SECTION ALONG EAST - WEST DIRECTION (P- Q)

LEGEND

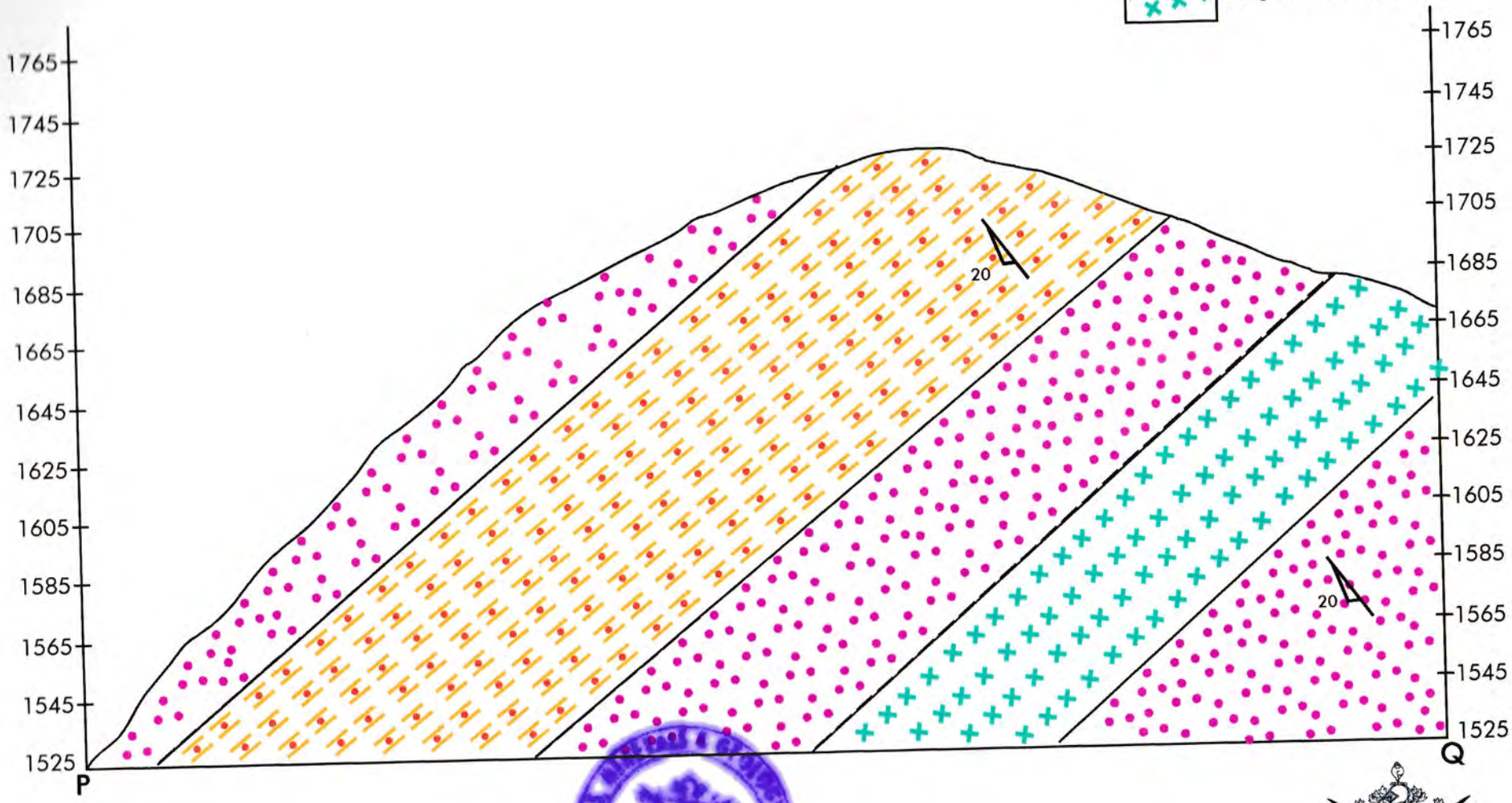
Highly Weathered Mica Schist

Quartizitic Mica Schist

Lingtse Granitic Gneiss

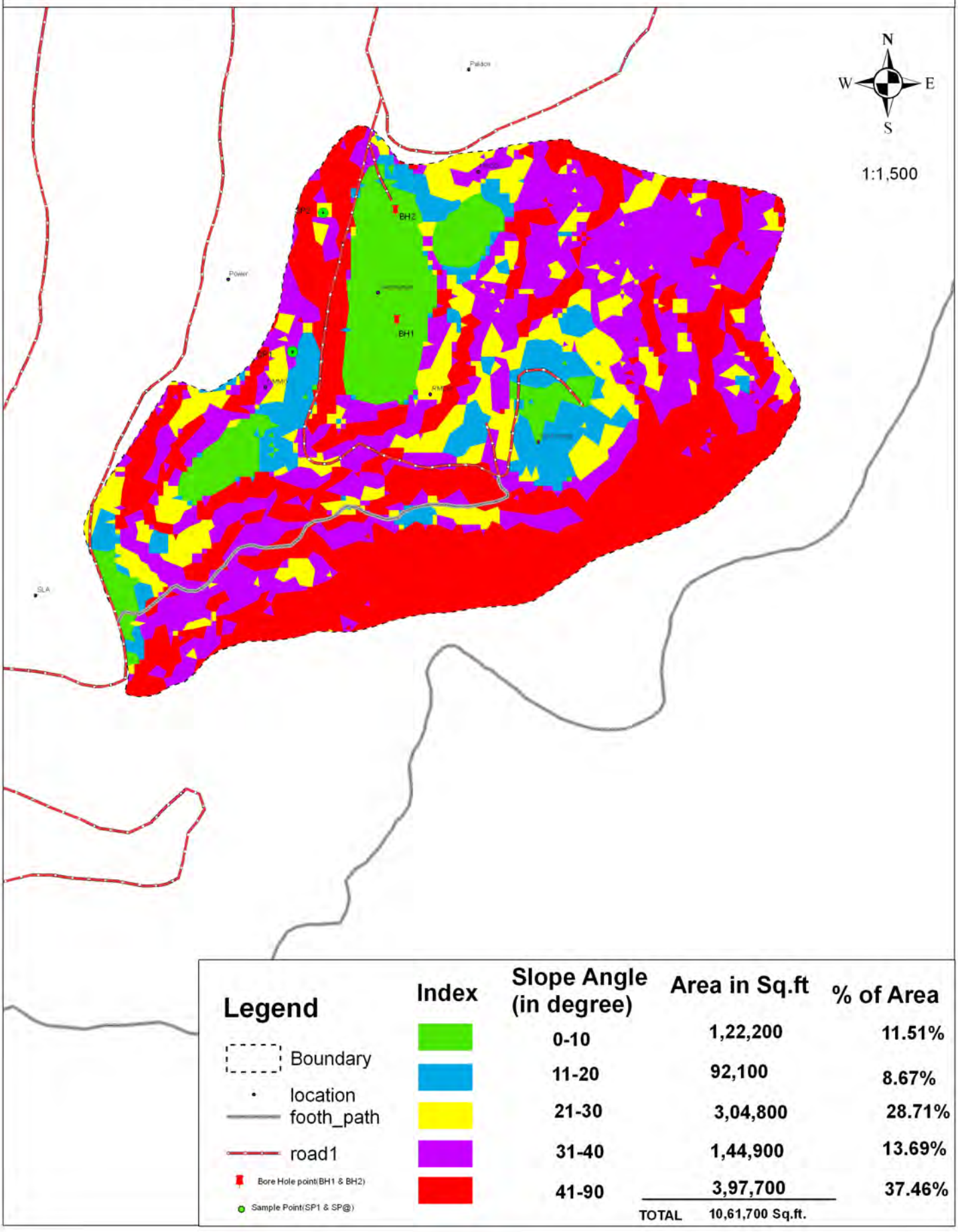
N

Scale 1:2000



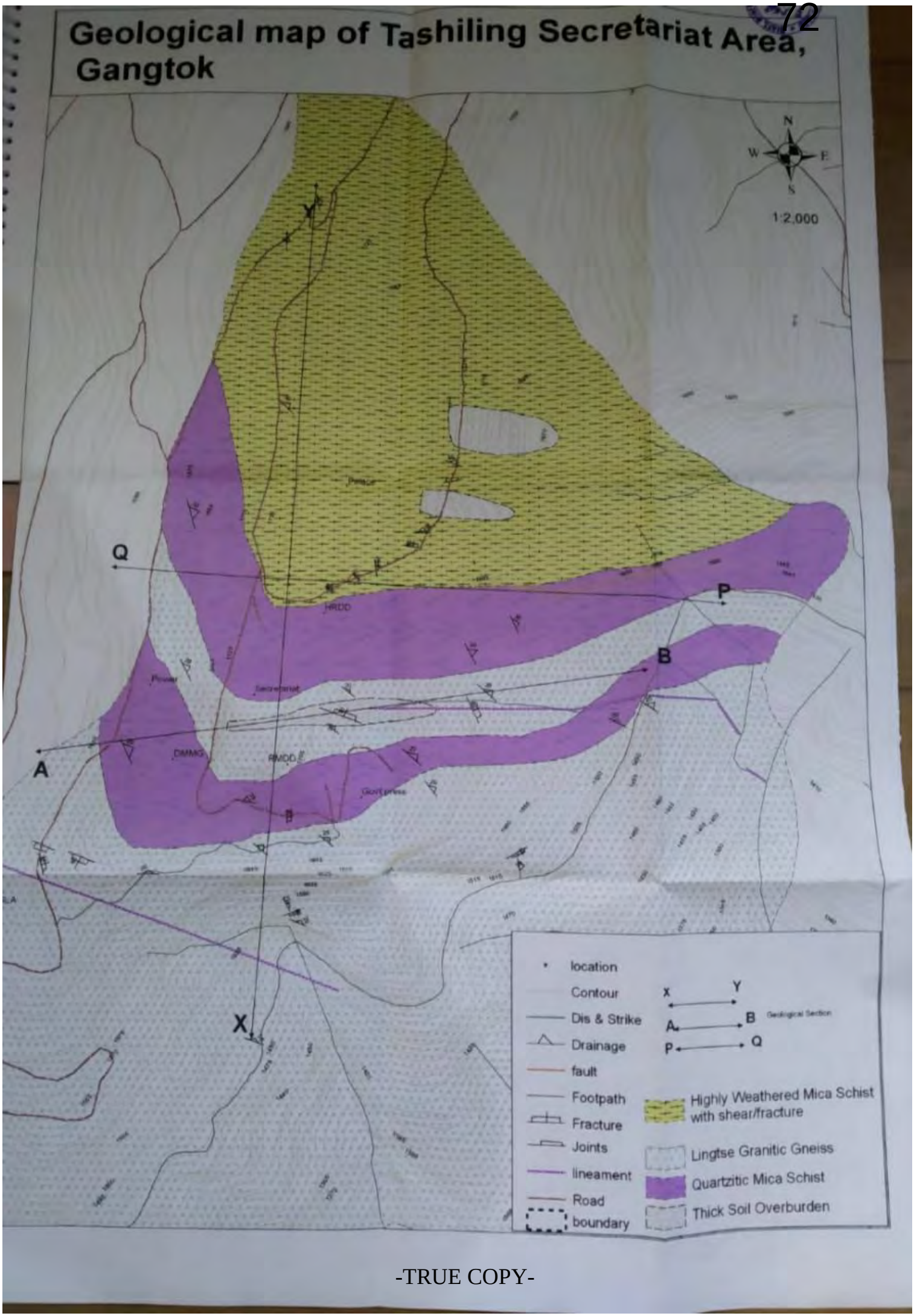
DEPARTMENT OF MINES, MINERALS & GEOLOGY
GOVERNMENT OF SIKKIM

SLOPE ASSESSMENT FOR TASHILING SECRETARIAT AREA, GANGTOK



Legend	Index	Slope Angle (in degree)	Area in Sq.ft	% of Area
Boundary		0-10	1,22,200	11.51%
location		11-20	92,100	8.67%
footh_path		21-30	3,04,800	28.71%
road1		31-40	1,44,900	13.69%
Bore Hole point(BH1 & BH2)		41-90	3,97,700	37.46%
Sample Point(SP1 & SP@)			TOTAL 10,61,700 Sq.ft.	

Geological map of Tashiling Secretariat Area, Gangtok



-TRUE COPY-

SIKKIM

GOVERNMENT GAZETTE

EXTRAORDINARY
PUBLISHED BY AUTHORITY

Gangtok | Tuesday 06th April, 2021 | No. 86

GOVERNMENT OF SIKKIM
DEPARTMENT OF MINES AND GEOLOGY
GANGTOK – 737101

No. 17/DMG/20-21 Date:- 19.03.2021

NOTIFICATION

In continuation with notification no. GOS/UD&HD/6(294)2001/A dated 15.10.2001 and gazette no. 387 dated 15/10/2001 which notified that the maximum height of buildings constructed in allotted sites or private holdings within a notified area shall be in accordance with the suitability and profile of the locations based on the stability map of the area as prepared by Mines and Geology Department from time to time which shall be as follows:

Stability Zone	Admissible no. of floors
1.	5 ½ storeys
2.	4 ½ storeys
3.	3 ½ storeys
4.	2 ½ storeys
5.	1 ½ storeys
6.	No construction is allowed

The department of Mines and Geology hereby notifies the parameters for determination of stability zones of each zone as follows. These parameters are known as site stability zonation parameters and will be strictly followed during categorization of zones:

Zone 1

Rock Properties:	Bed rock/parent soil is expected at foundation depth. Unweathered/ surfacial weathering, compact with no joint spacing, moderate to high compressive strength, high frictional resistance.
Built up area:	Training of jhoras/drains have been completed and done properly (with safe distance)
Overburden:	Thin to medium thick having good bearing capacity of soil.
Bearing Capacity:	> 35 T/m^2
Ground Water Activity:	Low
Relation Between Natural Slope And	

Rock Bed/Foliation:	Favourable, >30°
Adverse Geo-Environment:	Nil
Upslope pressure:	Nil
Vibration Impact:	Minimum
Slope:	Gentle to moderate. <15°
Depth of soil:	<3m
Relative relief:	<100m
Hydrological conditions:	Dry/nil
Category:	Suitable after taking appropriate measures to slope/precautionary and preventive measures at the time of foundation levelling.

Zone 2

Rock Properties:	Bed rock/parent soil is not expected at foundation level. weathering on surface of contact zone is suspected, medium to high compressive strength, jointed rocks with minimum spacing, joint plane undulating with high frictional resistance.
Built up area:	Training jhora/drain was done but not properly maintained.
Overburden:	Medium thick (rock expected at considerable depth)
Bearing Capacity:	15-35 T/m^2
Ground Water Activity:	Low to medium
Relation Between Natural Slope And Rock Bed/Foliation:	Favourable,20-30°
Adverse Geo-Environment:	Nil.
Upslope pressure:	Suspected
Slope:	Gentle to moderate, 16-25°
Upslope pressure:	Nil
Vibration Impact:	Minimum
Depth of soil:	3-8 metres
Relative relief:	101-300 metres
Hydrological conditions:	Damp
Category:	Suitable after taking proper surface/sub-surface drainage system.

Zone 3

Rock Properties:	Bed rock/parent soil is not expected at foundation level. Weathering on surface of contact zone is suspected, low to medium compressive strength, jointed rocks with minimum spacing, and joint plane smooth with low frictional resistance.
Built-up area:	Jhora training is required/annual maintenance of drain is necessary.
Overburden:	Thick soil overburden, having moderate to low soil bearing capacity.
Bearing capacity:	<15 T/m^2
Ground Water Activity:	Medium to high
Relation Between Natural Slope And	

Rock Bed/Foliation:	Rock dips at some angle to direction of slope, <20°
Adverse Geo-Environment:	Rocks are subjected to folding, fracturing & weathering.
Slope:	Moderate to high. slope which reflects the competency of slope forming materials 26-35°
Upslope pressure:	Suspected.
Vibration Impact:	Low to medium
Depth of soil:	>8m
Relative relief:	>300m
Hydrological conditions:	Wet
Category:	Suitable after taking various geotechnical corrective measures.
Zone 4	
Rock Properties:	Bed rock/parent soil is beyond foundation level. high degree of weathering is suspected, low compressive strength, jointed rocks, joint plane smooth with low frictional resistance
Built up area:	Untrained jhora/ erosional potential jhora
Overburden:	Medium thick to thick soil overburden
Bearing capacity:	<10 T/m^2
Ground Water Activity:	Higher water regime.
Relation Between Natural Slope And Rock Bed/Foliation:	Slightly adverse to adverse.
Adverse Geo-Environment:	Gully erosion & collapse of jhora facing slopes at isolated places, formation of cracks or fissures on the ground. Creep movement suspected.
Slope:	Steep, 36-45°
Upslope pressure:	Suspected.
Vibration Impact:	Low to medium
Depth of soil:	>8m
Relative relief:	>300m
Hydrological conditions:	Dripping
Category:	Not suitable for habitation unless immediate protective measures to safeguard upslope/ minimise further degradation of stability condition of upslope area.
Zone 5	
Rock Type:	Bed rock/parent soil is beyond foundation level. high degree of weathering is suspected, low compressive strength, jointed rocks, joint plane smooth with low frictional resistance
Built up area:	Nil
Overburden:	Thick with low soil bearing capacity.
Bearing capacity:	<10 T/m^2
Ground Water Activity:	High.
Relation Between Natural Slope And	

Rock Bed/Foliation	Slightly adverse to adverse.
Adverse Geo-Environment:	Area subjected to isolated slope failure, creep movement widespread, wide cracks on ground.
Slope:	high to steep slope, >45°
Upslope pressure:	Present.
Vibration Impact:	Medium
Depth of soil:	>10m
Relative relief:	>300m
Hydrological conditions:	Flowing
Category:	Area not suitable needs immediate protective measures to protect upslope area.
Zone 6	
Rock Type:	Bed rock/parent soil is beyond foundation level. high degree of weathering is suspected, very low compressive strength, jointed rocks, joint plane smooth with low frictional resistance
Built up area:	Nil
Overburden:	Thick with low soil bearing capacity.
Bearing Capacity:	<5 T/m^2
Ground Water Activity:	High.
Relation Between Natural Slope And Rock Bed/Foliation:	Adverse.
Adverse Geo-Environment:	Incidences of slope failure, gully erosion, adverse slope facing towards jhora section etc.
Slope:	High slope >45°
Upslope pressure:	Present.
Vibration Impact:	medium
Depth of soil:	>10m
Relative relief:	>300m
Hydrological conditions:	Flowing
Category:	Area not suitable needs immediate protection for arresting further aggravation of instability problems.

Further, the department will be reviewing the zonation ratings on the following conditions.

Conditions and pre-requisite for review of site stability report/up-gradation of Land Stability Zonnation for particular site.

1. Recommendation suggested in site stability report should be adopted during construction of structures.
2. Training of untrained Jhora and maintenance at regular intervals which is located adjacent to the plot.
3. Construction of structure below the building which was barren before which also aids in improving the stability of the upslope area. Further, construction of building in the downslope area also acts a retaining/protective wall for the houses located in the upslope area.

Minimum of three (03) years after the completion of house construction so as to observe the incidences of differential settlement as per the IS Code of Practice for calculation of settlements of foundations (IS Code:- 8009(Part 1)-1978(Reaffirmed 2003)). The review of the rating on zonnation can be done.

Proper channelization of surface runoff by providing catchment drains especially during the rainy seasons and connect it to natural waterways/Jhora which also improves the stability of the area due to reduced erosions and percolation of water in the slope concerned.

Any site improvement activities/works like grouting/micro-pilling/retaining works/rock bolting/anchoring/shot creting works as per site requirement has been done in the area which will re-strengthen the stability condition shall be entertained for review of stability zonnation rating.

-Sd/-
(B.P Pradhan, IFS)
Secretary

File No. 17/DMG/20-21. n.s.p - 10

-TRUE COPY-

ANNEXURE-R/9

आज़ादी का अमृत महोत्सव

Fax No. : 03592 206836
Phone No.: 03592 206192

DEPARTMENT OF MINES & GEOLOGY
GOVERNMENT OF SIKKIM
GANGTOK.

Ref No: 766/DM&G/21-22 *Date:* 17/2/22

To,

The Mesaso Infrastructure Private Ltd.,
3rd floor, Vega Circle Mall,
3rd Mile, Sevoke Road, Siliguri,
West Bengal.

Sub: Reply to the letter no. MIPL/SITE/09/2021-22 dated 15.02.2022.

Sir,

This is in reference to the letter No. MIPL/SITE/09/2021-22 dated 15.02.2022, regarding the site stability report issued by Department of Mines and Geology of the land situated at Old West Point School Complex vide reference No. 1/62(3) DM&G/21-22/478 dated 29. 12.2021, where it was recommended to do "the load impact assessment of the surrounding areas" before the construction of multistoried structure.

The applicant has submitted the certificate provided by Jadavpur university, (Ref. No. nil, dated. Nil) which state that the load of the proposed structure is 21T/M^2 which is less than the soil bearing capacity in the area. Hence, they recommended that the load of the structure is confined within the construction area. Therefore, the suggestions in the site Stability report on above matter is not required.

Yours Faithfully,

Senior Geologist
Deptt. of Mines & Geology
Government of Sikkim
Gangtok

Senior Geologist

Minerals, Mines & Geology Deptt.

-TRUE COPY-

VAKALATNAMA
BEFORE THE NATIONAL GREEN TRIBUNAL
EASTERN BENCH, KOLKATA
ORIGINAL APPLICATION NO. 05/2022

IN THE MATTER OF:

DR. BINA BASNETT — Applicant

-VERSUS -

STATE OF SIKKIM & ORS. — Respondent(s)

KNOW ALL to whom those present shall come that I, ..., **RESPONDENT** / OPPOSITE PARTY, in the above Original Application do hereby appoint and return **Additional Advocate General Mr. Sudesh Joshi and Fizza Zaidi** Advocate of the National Green Tribunal, to act, appear and plead in the above noted case in the Tribunal.

To sign, file, verify, present pleadings, appeals, cross objections or petitions for execution, review, revision, withdrawal, compromise or other petitions or affidavits or other documents and all other proceedings that may be taken in respect of any application connected with the same or any decree or order passed therein on my/our behalf, and to represent me/us and to take all necessary steps on my/our behalf in the above matter.

And I/We the undersigned do hereby agree to ratify and confirm all acts done by the Advocate or his substitute in the matter as my I our own acts, as if done by me justify to all intents and purposes. I/We agree to ratify all act done by the aforesaid advocate, in pursuance of this authority.

IN WITNESS WHEREOF I/We do hereunto set my/your hand to those present the contents of which have been understood by me/us on this ..... day of .....2022.

Accepted subjected to fees.

Advocate
(AAG Mr. Sudesh Joshi)

Client

Additional Director
Mines & Geology
Govt. of Sikkim

MEMO OF APPEARANCE

To,

The Registrar,
National Green Tribunal, Eastern Zone Bench
Kolkata – 700156.

Sir,

Kindly enter my appearance in the above matter on behalf of the Respondent/ Opposite Party.

Dated .....

Advocate for the
Petitioner(s)/Appellant(s)/Respondent(s)

F-1157, CR Park, New Delhi - 110019
Phone: + 91 9958144569; E-mail: fizzajamalzaidi@gmail.com