Email **Director NMET**

Allocation of funds [₹1,99,84,735 (Rupees One Crore Ninety-Nine Lakh Eighty-Four Thousand Seven Hundred Thirty-Five Only)] for Limestone in Chhasra Block, Kachchh District, Gujarat State for G3 Stage Mineral Exploration under NMET.

From : commissioner-cgm@gujarat.gov.in Sat, Jan 20, 2024 04:45 PM

Subject : Allocation of funds [₹1,99,84,735 (Rupees One Crore Ninety-Nine Lakh Eighty-Four Thousand Seven Hundred Thirty-Five Only)] for Limestone in Chhasra Block, Kachchh District, Gujarat State for G3 Stage Mineral Exploration under NMET. 3 attachments

To : Director NMET <nmet-mines@gov.in>

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Please find attachment…

Dr. Dhaval Patel, IAS
Commissioner of Geology & Mining
Gujarat State-Gandhinagar

Letter Chhasra.pdf
265 KB

Proposal for Chhasra Block_Limestone.pdf
6 MB

Proposal for Limestone in Chhasra Block, Kachchh District, Gujarat State for G3 Stage Mineral Exploration under NMET.

Commodity: Limestone

By

Commissioner of Geology and Mining
Gujarat

Place: Gandhinagar **Date: 16 January 2024**

Summary of the Block for G3 stage exploration

	Features	Details		
	Block ID	CGM/NMET/BP/2024/03		
	Current Exploration Agency	CGM, Gujarat		
	G4 stage Geological Report (Previous stage Geological Report)	GSI report no.:WRO-11626 & WRO-13796		
	Commodity	Limestone		
	Mineral Belt	Gaj Formation		
	Completion Period with entire Time schedule to complete the project	06 months		
	Objectives	To assess the mineral resource of Limestone mineral at G3 stage in the proposed study area.		
	Whether the work will be carried out by the proposed agency or through outsourcing and details thereof. Components to be outsourced and name of the outsource agency	The work will be carried out through outsourcing.		
	Name/ Number of Geoscientists	Geologist: 1 (Field) + 1(HQ)		
	Expected Field days (Geology, Geophysics, Surveyor)	60 days: Field Geologist 60 days: Surveyor		
1.	**Location**			
	Co-ordinates (Latitude, Longitude) of Block Boundary	**Block corner point**	**Latitude**	**Longitude**
		1	23° 21' 58.98"	68° 44' 44.68"
		2	23° 21' 54.27"	68° 51' 18.36"
		3	23° 20' 43.47"	68° 50' 21.61"
		4	23° 20' 45.94"	68° 49' 39.79"
		5	23° 19’ 44.70”	68° 48’ 26.82”
		6	23° 19’ 58.24”	68° 44’ 43.56”
	Villages	Sukhpar, Vadsar, Rampar, Chhasra, Trambau, Butta		
	Tehsil/ Taluk	Abdasa		
	District	Kachchh		
	State	Gujarat		
2.	**Area (hectares/ square kilometres)**			
	Block Area	3537 hectares		
	Forest Area	NA		
	Government Land Area	NA		

	Private Land Area	NA
3.	**Accessibility**	
	Nearest Rail Head	Naliya railway station – 10.00 km
	Road	Nearest road-NH 41
	Airport	Bhuj airport-88 Km
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	Sub-parallel
	Rivers/ Streams	"Mithi" river passing through the study area. This river is seasonal.
5.	**Climate**	
	Mean Annual Rainfall	below 450 mm
	Temperatures	Minimum – 7° C (December) Maximum– 47° C (June)
6.	**Topography**	
	Toposheet Number	41A/11, 41A/15
	Morphology of the Area	The area is generally covered by dry barren and agricultural fields. The block area depicts plain with gentle slope towards coast(southwest). The elevation of the area ranges from 20m to 65m above mean sea level.
7	**Availability of baseline geoscience data**	
	Geological Map	Plate-1
	Geochemical Map	Not available
	Geophysical Map (Aerogeophysical, Ground geophysical, Regional as well as local scale GP maps)	Not available
8	**Justification for taking up G3 stage mineral exploration**	• The block is proposed based on the geology of the area and sample collection during current year field season. • It consists of Gaj Formation which includes silty shales and impure limestone. Gaj formation limestone occurs as stratiform deposit. • During the current year's field observation, samples are collected from the study area and upon completing chemical analysis, the collected rock samples revealed an average CaO content of 42.32%. So, this area is very

		promising and recommended for further studies. Thus, the block is suggested for G3 level of exploration. • In order to fillful the demand of Limestone Mineral in cement industries, our organization is planning for ML directly, which will expedite the auction process & as a result of which state will get more royalty income as well as industries will get profit.

Detailed description:

1. **Block Summary**

Physiography

The study area is located in the Abdasa taluka, Kachchh district in the western region of Gujarat. The area under investigation is a western plain, these plains are mainly composed of recent alluvium, wind-blown sands covering the Tertiary strata. These plains gradually merge into mudflats of Rann of Kutch. The topography of the study area is mostly undulating. The geomorphology shows dissected and undulating topography and the elevation of the region unfolds as a gradual ascent from lowland plains in the southwest to the commanding heights of elevated terrain in the northeast. There is Mithi river passing through the area which is seasonal in character.

Background Geology (Regional Geology & Geology of the Block).

Kachchh, located in western Gujarat, is renowned for its intricate geological history. The stratigraphy of Kutch mainly comprises rocks ranging in age from middle Jurassics to Recent. Major part of the Kutch mainland is occupied by the Mesozoic sediments and Deccan Trap rocks. Tertiary sediments occupy the coastal strips of the mainland bordering Mesozoic sediments and Deccan traps. The study area falls in the western part of Kutch mainland where Tertiary sequence is developed and Tertiary rocks overlie unconformably the basaltic rocks belonging to Deccan traps. Lithologically, the proposed area comprises of Gaj formation which includes impure limestone. In this area the limestone is associated with the Alluvium, Sand, clay, Basalt, marl, shale.

The general stratigraphic succession of the region is as follows:

Age	Formation	Lithology
Holocene	Rann Formation	Rann clay and deposits
	Jantral Formation	Unstabilized sand sheet and sand dune deposit
Lower Pleistocene	Kothara Formation	Pebbly sandstone, conglomerate gravel and sand
Pliocene	Sandhan Formation	Micaceous sandstone, siltstone, conglomerate and calcareous clay with marl
Lower to Middle Miocene	Gaj Formation	Shale interbedded with fossiliferous limestone and marl
Upper Oligocene to Lower Miocene	Khari Nadi Formation	Variegated siltstone and gypseous claystone
Middle to Upper Oligocene	Maniyara Fort Formation	Calcareous and gypseous claystone/siltstone, clay, coral limestone and sandstone

Middle Eocene	Fulra Formation		Foraminiferal limestone, glauconitic shale and clay
Lower Eocene	Kakdi Nadi Formation		Gypseous, lignite- bearing shale, fossiliferous nodular limestone and clay, ferruginous shale and clay with intercalated marl
Palaeocene	Matanomadh Formation		Laterite, sandstone, conglomerate and bentonitic and kaolinitic clay
Upper Cretaceous to Eocene	Deccan Volcanics	Extrusive	Andesitic trachyte
		Intrusive	Olivine gabbro, basalt and dolerite dyke
		Extrusive	Basalt flows with intertrappean sediments
Cretaceous	Bhuj Formation		Glauconitic and burrowed sandstone, siltstone, shale, limestone, marl, conglomerate, ironstone and clay with marine and plant fossil
Upper Jurassic to Lower Cretaceous	Katrol Formation		Shale, fossiliferous sandstone, marl and conglomerate
Middle to Upper Jurassic	Chari Formation		Gypseous shale, siltstone and conglomerate with phosphatic nodule, oolitic limestone
Middle Jurassic	Pachchham Formation		Gypseous shale, siltstone, limestone, sandstone and conglomerate

The stratigraphic sequence of the proposed block area is as follows:

Lithounits	**Age**
Alluvium/surface soil	Recent to Holocene
Limestone	Tertiary

Gaj Formation

The Gaj Formation unconformably rests on the palaeocene sediments. It consists of variegated clays, fossiliferous limestone, gypseous shale and bentonitic clays. These are mostly horizontal with a low dip towards south-southwest. The lowermost member is a variegated clay showing tinges of white, yellow, red and brown. The next succeeding member is a brownish to yellowish coloured hard and compact fossiliferous limestone carrying lamellibranches, gastropods and echinoderms. Shales are grey to dark grey in colour with small scattered flakes of gypsum. It carries thin

intercalations of calcareous sandstone and argillaceous limestone. Discontinuous lenses of bentonitic clays showing imperfect layering are found towards the top of this formation. The Gaj Formation belongs to the shallow water marine argillaceous facies.

Soil and Alluvium

Major portion of the area is covered with soil or alluvium. This can be divided as the type formed due to weathering of limestone and the type formed due to deposition of clays brought by wind. The soil formed due to weathering of limestone is regur soil and wind deposit sediment is brownish color in nature

Mineral potentiality based on geology, geophysics, ground geochemistry etc.

It was noted that the Gaj formation exposed as outcrops in the area of investigation. It is exposed on the surface in forms of low mounds of limestone.

Limestone rock of this area are horizontal to sub horizontal and may not have undergone any tight folding.

The limestone found is mostly dirty creamy white coloured and the rock is hard and compact. The texture of rock is mostly fine to medium grained at times ranging into coarse grade also. At some places current beddings are also observed. In this limestone deposit the thickness is variable due to its topography.

Scope for proposed exploration

1. Location:- Village: Sukhpar, Vadsar, Rampar, Chhasra, Trambau, Butta,Tehsil: Abdasa, District: Kachchh, State: Gujarat.
2. Quantum of work: The approximate core drilling work is 1100 meters.
3. Rock formations to be drilled: Various types of soil, sub-soil, Limestone, clay, etc.
4. The boreholes shall be in depth range of approximately 20 m. However, this is indicative only and may vary as per actual geological conditions.
5. Type of Drilling: Core drilling by Hydraulic Drilling Rigs.
6. Borehole size: The holes shall be derived in NQ sizes.
7. The core recovery in all the formation should be at least 90% except in fault zone, weathered zone, soil, sand and structurally disturbed area
8. CGM will provide proposed borehole location plan of all the areas to be covered under exploration.
9. Sampling: There will be one mineral/rock sample for every 1-meter run. Each sample should be cut by core splitter. Each run shall be marked properly by plastic cards and the core boxes shall be numbered properly. Each sample shall be reduced to an approximate quantity by following the standard sampling procedures such as homogenizing, coning, quartering and pulverizing into 100/200 mesh and be prepared into two packets of 100-200 gm each. The final sample pockets shall be properly labelled with BH number, sample run.

Recommendations of G4 Stage Mineral Exploration Report.

G. Vijayasarathi, Geological Survey of India (Field season-1982-83) has done the geological mapping of the toposheet no. 41 A/10, 41 A/11 & 41 A/15. An area of about 430 sq Km was mapped on 1:50000 scale in the western part of Kutch district, mainly comprising of Tertiary rocks. In the geological map, limestone is depicted by the geologist.

G. Vijayasarathi & A.B. Sabale, Geological Survey of India (Field season-1983-84) has done the geological mapping of the toposheet no. 41A/10, 41A/11 & 41A/15.

Objectives of Exploration

- To know the continuity of the mineral body both along the strike and dip.
- To map the extent of the ore body.
- To ascertain the grade of Limestone deposit.
- Ore resource/reserve estimation in accordance with MEMC Rule-2015

2. Previous Work

Previous Exploration in proposed block area as well as adjoining area: All the sample (bed rock/trench/ groove/soil), borehole location should be plotted on the geological map and analytical data should be discussed briefly

Previously Geological survey of india conducted a geological mapping on 1:50000 scale in Toposheet no. 41A/10, 41A/11 and 41A/15, revealing the geological potential for limestone in the area.

CGM officials has also carried out field in current year survey of the proposed area and taken grab samples 36 Nos and done the chemical analysis of that samples. So chemical analysis also suggests that good quality limestone present in the study area, it was recommended to more sampling of the area. Chemical analysis data is given as per Annexure-1.

3. Block description

Block corner points	Latitude	Longitude
1	23° 21' 58.98"	68° 44' 44.68"
2	23° 21' 54.27"	68° 51' 18.36"
3	23° 20' 43.47"	68° 50' 21.61"
4	23° 20' 45.94"	68° 49' 39.79"
5	23° 19’ 44.70”	68° 48’ 26.82”
6	23° 19’ 58.24”	68° 44’ 43.56”

4. Planned Methodology

- The drilling for Limestone is to be carried out on the grid pattern of 800 x 800 meters as the deposit is of irregular habit, for G3 stage as per MEMC, 2015.
- The drilling will be carried out with the help of hydraulic drilling rigs.
- The depth for each borehole is set to be 20 meters or depending on the encountered mineralized zone.
- As it is bedded deposit so the drilling will be vertical.
- The Blocks boundary shall be surveyed by DGPS in WGS-84 datum for demarcation of block boundary/corner points.
- Boreholes will be fixed on the ground whose RL's and co-ordinates of survey and exploration points will be determined.

5. Nature Quantum and Target

Components	G3
Aerial reconnaissance	NA
Geological Survey	NA
Scout drilling / Systematic drilling Only Systematic drilling	Refer below
Petrographic and mineragraphic studies	Bulk density/Specific Gravity studies
Synthesis of all available data	i) Integration of regional/ detailed geophysical, geological and geochemical data, if not done earlier. ii) Synthesis of all available data and Report writing

Borehole spacing (As per MEMC, 2015)

Type of deposit	**Bedded Stratiform and Tabular deposit of regular habit (Minerals to be identified)**	**Bedded stratiform and tabular deposits of irregular habit (Minerals to be identified)**	**Lenticular bodies occurring en echelon Lenses, pockets. (Different minerals)**
G3 Stage	800 m	Not applicable	Not applicable
	(Vertical depth of intersection of mineralised zone for different level boreholes should be specified, number of boreholes (first, second, third), borehole spacing, approximate length of different level of boreholes may also be specified)		

6. Exploratory Drilling

- The boreholes shall be in depth range of approximately 20 m. However, this is indicative only and may vary as per actual geological conditions.
- Type of Drilling: Core drilling by Hydraulic Drilling Rigs.
- Borehole size: The holes shall be derived in in NQ sizes.
- While drilling, wherever water table is encountered, depth of the water table should be recorded and to be mentioned in the driller logs.
- The core recovery in all the formation should be at least 90% except in fault zone, weathered zone, soil, sand and structurally disturbed area

7. Manpower deployment

Sl. No.	Activities	Unit	MONTHS					
			1	2	3	4	5	6
1	Camp Setting	Month						
2	Surface Drilling (3 rigs)	m.						
3	Survey Party days (1 Party)	day						
4	Geologist Party days in field (1 Party)	day						
5	Sampling Party days, Core Sampling (1 party)	day						
6	Laboratory Studies	Nos.						
7	Camp Winding	Month						
8	Geologist Party days in HQ (1 Party)	day						
9	Geological Report Writing with Peer Review	Month						

Note: 1. Commencement of project may be reckoned from the day the exploration acreage is available along with all statutory clearances.

2. Time loss on account of monsoon/agricultural activity/forest clearance/local law & order problem may be additional to above time line.

8. Break-up of expenditure

The cost has been estimated based on actual schedule of rates mandated in the circularOM No. 61/1/2018/NMET dated 31st March 2020 for NMET funded projects which is **Rs. 199.84 Lakhs.** The detailed cost sheet for G-3 exploration for Limestone in proposed PLDS Block is given below:

SL. NO.	Item	Estimated Cost (Rs.)
1	Drilling	**5816200**
2	Geology and Survey	**1138500**
3	Laboratory	**8813125**
	Sub Total (1 to 3)	**15767825**
4	Exploration Report	**788391**
5	Proposal Preparation	**380000**
	Total	**16936216**
	GST 18%	3048519
	Grand Total (including GST)	**19984735**
	Say Rs. In Lakhs	**199.84**

9. References

- "Report on Geological mapping of the Tertiary rocks of Kachchh district, Gujarat" by G. Vijayasarathi & A.B. Sabale (1985), Ahmedabad, Geological Survey of India, Gujarat circle- western region.
- "Report on Geological mapping of the Tertiary rocks of Kachchh district, Gujarat" by G. Vijayasarathi (1984), Ahmedabad, Geological Survey of India, Gujarat circle-western region.
- Bhukosh (www.gsi.gov.in)
- Tertiary Stratigraphy of Kutch by S.K. Biswas (1992)

List of Annexures

Annexure-1: Chemical analysis data of collected samples
Annexure-2: Cost Estimation Sheet

List of Plates

Plate 1: Proposed block boundary over existing Geological map.
Plate 2: Proposed Borehole Location Map.
Plate 3: Proposed block boundary over topographic map.

Chemical analysis data													Annexure-1		
Sr.No.	Latitude	Longitude	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	TiO2 (%)	CaO (%)	MgO (%)	Na2O (%)	K2O (%)	P2O5 (%)	SO3 (%)	LOI	Total	Sp. Gravity
1	23°21'19"	68°46'04"	7.67	6.75	4.16	0.31	40.78	0.6	0.14	0.24	0.06	0.09	38.43	99.22	2.73
2	23°21'11"	68°46'03"	27.87	9.05	6	0.35	34.51	0.4	0.48	0.16	0	0	20.95	99.77	2.75
3	23°21'15.6"	68°45'57.8"	7.09	4.08	4.65	0.27	42.84	1.34	0.09	0.35	0.09	0.1	38.62	99.51	2.71
4	23°21'09.9"	68°45'46.1"	19.83	6.44	5.4	0.45	37.1	1.03	0.39	0.96	0.13	0.16	27.63	99.52	2.76
5	23°21'02.0"	68°45'48.7"	8.57	3.73	4.51	0.29	44.32	0.86	0.37	0.41	0.08	0.13	36.07	99.34	2.77
6	23°21'12"	68°45'35"	22.2	7.11	4.61	0.56	36.78	1.49	0.99	1.19	0.12	0.26	24.22	99.52	2.77
7	23°20'24"	68°44'59"	21.36	3.05	6.4	0.35	41.03	0.25	0.41	0.12	0	0	26.76	99.73	2.73
8	23°20'42"	68°45'42"	11.36	4.27	3.12	0.28	44.46	0.8	0.16	0.54	0.08	0.05	34.38	99.5	2.76
9	23°21'33"	68°46'4"	7.62	4.03	5.76	0.28	39.32	3.35	0.06	0.38	0.08	0.09	38.64	99.61	2.78
10	23°21'51"	68°45'57"	11.39	5.53	7.07	0.45	38.16	1.1	0.15	0.61	0.63	0.12	34.19	99.39	2.8
11	23°21'38"	68°45'39"	5.51	5.78	5.6	0.17	43.45	0	0.42	0.11	0	0	38.16	99.2	2.81
12	23°21'37"	68°45'42"	7.77	3.82	6.61	0.37	42.67	0.82	0.06	0.38	0.09	0.06	36.88	99.54	2.74
13	23°21'33"	68°45'33"	7.89	2.56	18.58	0.25	38.32	0.63	0.09	0.17	0.18	0.06	30.89	99.62	2.71
14	23°21'27"	68°45'33"	8.29	3.03	3.5	0.24	46.3	0.72	0.13	0.31	0.09	0	36.86	99.47	2.79
15	23°21'21"	68°45'41"	9.76	3.34	5.87	0.28	43.43	0.97	0.22	0.42	0.14	0.04	34.56	99.03	2.72
16	23°21'03"	68°45'11"	3.89	2.06	5.47	0.18	46.07	1.42	0.08	0.18	0.08	0.11	40.06	99.6	2.8
17	23°21'00"	68°45'11"	9.11	3.55	3.2	0.25	45.65	0.94	0.14	0.42	0.12	0.1	36.06	99.51	2.73
18	23°21'59"	68°44'57"	4.97	2.22	5.64	0.16	40.64	5.21	0	0.2	0.08	0.08	40.47	99.69	2.76
19	23°20'59"	68°44'58"	13.8	3.73	4.45	0.31	44.02	1.95	0.38	0.52	0.2	0.07	30.12	99.54	2.75
20	23°20'48"	68°45'02"	3.49	1.83	4.92	0.17	47.58	0.75	0.07	0.16	0.16	0.14	40.26	99.52	2.78
21	23°20'15"	68°45'27"	6.3	1.97	4.8	0.18	47.58	0.39	0.45	0.14	0	0	37.84	99.65	2.72
22	23°20'30"	68°45'28"	24.67	6.49	4.66	0.56	36.55	1.61	0.63	0.94	0.17	0.06	23.31	99.65	2.79
23	23°20'26"	68°45'38"	4.32	2.07	4.28	0.15	45.75	1.57	0.23	0.19	0.06	0.09	40.91	99.62	2.75
24	23°20'20"	68°45'26"	5.7	2.56	6.1	0.2	45.23	0.91	0.07	0.31	0.1	0.06	38.4	99.63	2.77
25	23°21'21"	68°49'42"	13.62	6.32	8.45	0.59	34.94	1.13	0.19	0.54	0.16	0	33.46	99.4	2.82
26	23°21'43"	68°48'34"	12.24	5.89	5.61	0.5	37.87	1.02	0.12	0.65	0.13	0.12	35.41	99.56	2.78
27	23°21'37"	68°49'10"	9.45	4.51	4.76	0.34	41.22	1.11	0.11	0.5	0.08	0.08	37.49	99.65	2.7
28	23°20'46"	68°50'19"	7.54	3.62	7.49	0.23	36.56	4.5	0.16	0.36	0.09	0.07	38.97	99.59	2.82
29	23°20'08"	68°48'40"	12.39	4.24	5.54	0.39	41.24	1.18	0.19	0.49	0.63	0.22	32.94	99.45	2.77
30	23°21'53"	68°46'05"	5.04	2.24	4.25	0.2	47.04	0.73	0	0.29	0.19	0	39.62	99.6	2.79
31	23°21'54"	68°46'39"	4.46	2.18	3.39	0.21	47.85	0.66	0.12	0.23	0.09	0	40.48	99.67	2.72
32	23°21'52"	68°46'55"	4.59	1.98	3.7	0.23	48.37	0	0.07	0.2	0.06	0.11	40.06	99.37	2.79
33	23°20'20"	68°46'51"	9.95	3.25	3.09	0.28	45.54	0.86	0.15	0.46	0.15	0	35.66	99.39	2.82
34	23°20'31"	68°47'30"	6.05	2.47	3.58	0.25	47.48	0.68	0.07	0.31	0.08	0.08	38.44	99.49	2.83
35	23°20'12"	68°47'46"	4.38	1.96	5.51	0.17	43.12	3.69	0.19	0.22	0.08	0	40.21	99.53	2.82
36	23°19'57"	68°48'20"	3.06	1.42	6.1	0.11	39.86	5.86	0.45	0.17	0.05	0.15	42.38	99.61	2.8

	Cost Estimate for Exploration of Limestone in Chhasra Block, Kachchh										
SL. N0.	**Item of Work**	**Unit**	**Base**	**Financial Year (2023-24)**			**Financial Year (24-25)**			**Total**	
			Rate	**Esc.Rate**	**Qty.**	**Amount**	**Esc.Rate**	**Qty.**	**Amount**	**Qty**	**Amount**
			1.4.90	**(Rs)**		**(Rs)**					**(Rs)**
A	**DRILLING**										
1	Surface Drilling (3 Rigs)	m.		5242	1100	5766200	0	0	0	1100	**5766200**
2	Transportation	Km.		36	0	0	0	0	0	0	**0**
3	Accomodation	One time / Drill		50000	1	50000	0	0	0	1	**50000**
4	Camp Setting / Winding	Drill/ month		250000	0	0	0	0	0	0	**0**
5	Road Making (Hilly Terrain)	Km		0	0	0	0	0	0	0	**0**
	Sub Total A					**5816200**			**0**		**5816200**
B	**GEOLOGICAL WORK**										
1	Survey Party Days (1 party)	day		8300	30	249000	0	0	0	30	**249000**
2	Geologist Party days (1 party)	day		11000	60	660000	0	0	0	60	**660000**
3	Core Sampling Party days(1 party)	day		5100	45	229500	0	0	0	45	**229500**
	Sub-Total B					**1138500**			**0**		**1138500**
C	**LABORATORY STUDIES**										
a	**Chemical Analysis**										
1	Primary + Check Samples										
	i) for 6 radicals (CaO,MgO,Al_2O_3, SiO_2,Fe_2O_3 & LOI)	Nos		2841	1000	2841000	2831	0	0	1000	**2841000**
	ii) External Check Samples for 6 radicals (CaO,MgO,Al2O3, SiO2,Fe2O3 & LOI)	Nos		2841	100	284100	2831	0	0	100	**284100**

	iii) For additional 2 Radicals SO3 & P2O5	Nos		670	0	0	1067	0	0	0	**0**
2	Composite Samples										
	i) for 12 radicals (CaO, MgO, Al_2O_3, SiO_2, Fe_2O_3, SO_3, P_2O_5, Mn_2O_3, TiO_2, K_2O, Na_2O & LOI,)	Nos		4851	1000	4851000	5304	0	0	1000	**4851000**
b	**Physical Analysis**										
1	X-RD Studies on composite	Nos		4000	100	400000	6184	0	0	100	**400000**
2	Spectroscopic Studies	Nos		24360	10	243600	6568	0	0	10	**243600**
3	Preparation of thin section	Nos		2353	5	11765	588	0	0	5	**11765**
4	Petrographic Studies	Nos		4232	5	21160	1552	0	0	5	**21160**
5	Specific Gravity determination	Nos		1605	100	160500	206	0	0	100	**160500**
	Sub-Total C					**8813125**			**0**		**8813125**
	Total A+B+C					**15767825**			**0**		**15767825**
D	**EXPLORATION REPORT -**								**788391.25**		**788391**
E	**PROPOSAL PREPARATION -**					**380000**			**380000**		**380000**
	GRAND TOTAL A to D					**15767825**			**788391.25**		**16936216**
						Total				**Say 169.36 lakhs**	

Chhasra Limestone Drilling Scheme - (CLDS), Kachchh District, Gujarat.

N

0 0.5 1 2 KM

1:30,000

474000 476000 478000 480000 482000 484000

2586000 2584000 2582000 2580000 2578000

23°22'30"N 23°21'40"N 23°20'50"N 23°20'0"N 23°19'10"N

68°45'0"E 68°45'50"E 68°46'40"E 68°47'30"E 68°48'20"E 68°49'10"E 68°50'0"E 68°50'50"E

Legend

CLDS Block Boundary

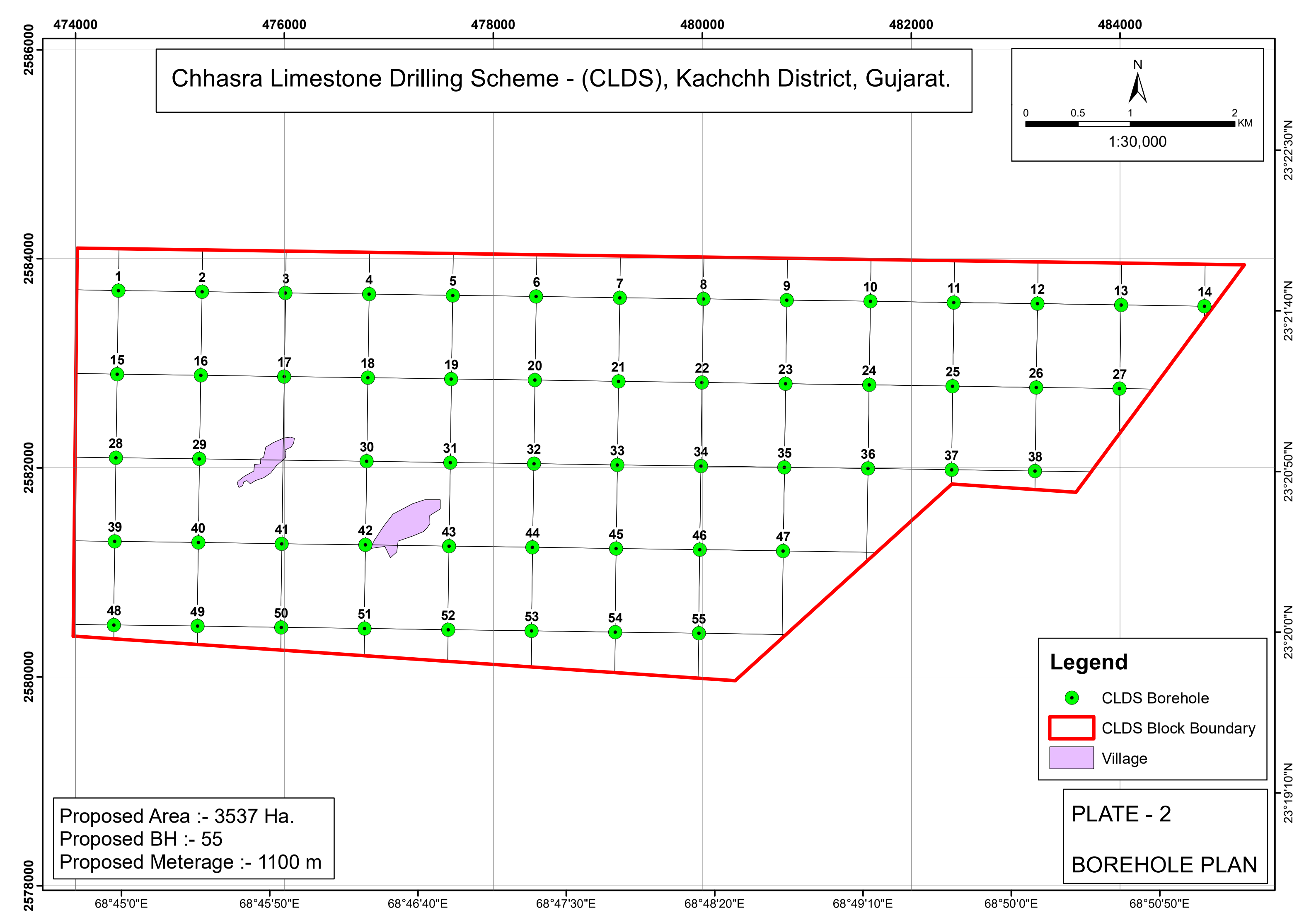
Geology

Guj Formation shale interbedded with fossiliferous limestone and marl

PLATE - 1

GEOLOGICAL PLAN

Chhasra Limestone Drilling Scheme - (CLDS), Kachchh District, Gujarat.



Proposed Area :- 3537 Ha.
Proposed BH :- 55
Proposed Meterage :- 1100 m

PLATE - 2

BOREHOLE PLAN

Chhasra Limestone Drilling Scheme - (CLDS), Kachchh District, Gujarat.

N

0 0.5 1 2 KM

1:30,000

474000 476000 478000 480000 482000 484000

2584000 2582000 2580000 2578000

23°22'30"N 23°21'40"N 23°20'50"N 23°20'0"N 23°19'10"N 23°18'20"N

68°45'0"E 68°45'50"E 68°46'40"E 68°47'30"E 68°48'20"E 68°49'10"E 68°50'0"E 68°50'50"E

Sukhpar
Stony waste
Haripar
Causeway
(Disused)
Open scrub
Khāri Nadi
Siphons
Chhasra
Siphon
Causeway
Mitti Nadi
Abda Pir
Covered tank
Wadsar
Tambāu
(PWD)
Canal
Rampar
Sluice
NH 8A

Legend

CLDS Block Boundary

PLATE - 3

TOPOSHEET PLAN