GROUND WATER PROSPECTS MAP

(PREPARED FROM SATELLITE IMAGE INTERPRETATION WITH LIMITED FIELD CHECKS)

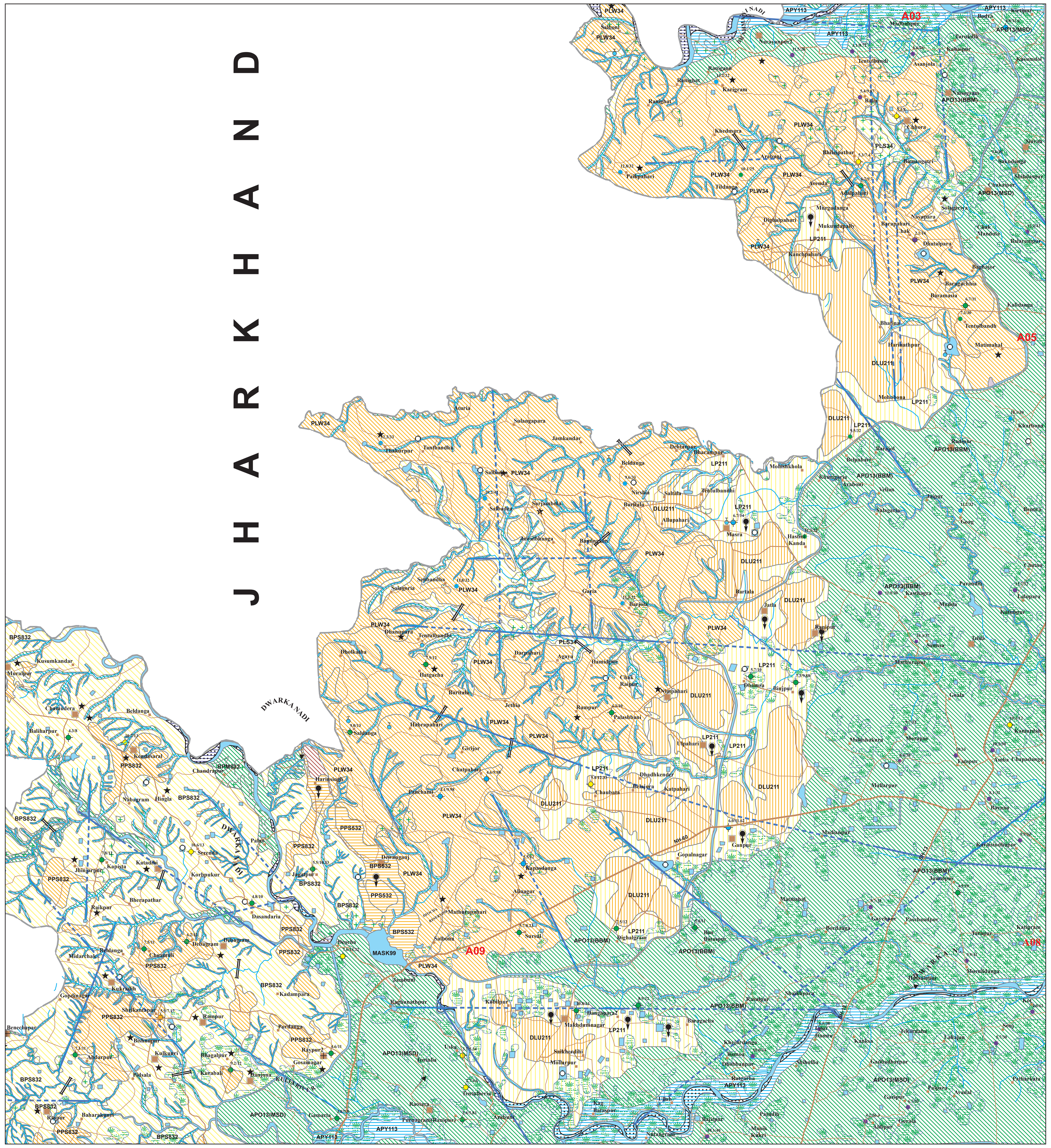
0 1 2 3 4 5 Kilometers

SCALE - 1 : 50,000

N / W / E / S

MAP SHEET NO. 72P/12

BIRBHUM DISTRICT, WEST BENGAL



DATA USED : IRS - P6 LISS III FCC dated February 2006, GROUND TRUTH & WELL OBSERVATION during April-May, 2009 & Jan-Feb, 2010, Published Geological maps & Literatures.

Designed & Developed by Hydrogeology Division, NRSC, ISRO

L E G E N D

MAP UNIT (HYDROGEOMORPHIC UNIT) REPRESENTED IN THE MAP WITH ALPHANUMERIC CODE (COLOUR INDICATES YIELD RANGE AND HATCHING INDICATE DEPTH RANGE)	GEOLOGICAL SEQUENCE / ROCK TYPE (REPRESENTED IN THE MAP WITH NUMERIC CODE)	GEOMORPHIC UNIT / LANDFORM (REPRESENTED IN THE MAP WITH ALPHABETIC CODE)	DEPTH TO WATER LEVEL PRE / POST- MONSOON (AVERAGE IN METERS) / NO. OF WELLS OBSERVED	RECHARGE CONDITIONS BASED ON AVAILABILITY OF WATER (RAINFALL & OTHER SOURCES)	G R O U N D W A T E R P R O S P E C T S: AQUIFER MATERIAL (LS = LOOSE SEDIMENTS, PR = PERMEABLE ROCK, FIR = FISSURED ROCK, FR = FRACTURED ROCK, WR / WM = WEATHERED ROCK / WEATHERED MATERIAL, IR = IMPERVIOUS ROCK, IM = IMPERVIOUS MATERIAL)	TYPE OF WELLS SUITABLE (DW = DUG WELL, RW = RING WELL, BW = BORE WELL, TW = TUBE WELL, DBW / DTW = DUG CUM-BORE WELL / DUG CUM-TUBE WELL)	DEPTH RANGE OF WELLS (SUGGESTED) MIN - MAX (IN METERS)	YIELD RANGE OF WELLS (EXPECTED) (in LPM or m^3 / day)	HOMOGENEITY IN THE UNIT & SUCCESS RATE OF WELLS (PROBABILITY) VERY HIGH / HIGH / MODERATE / LOW	QUALITY OF WATER POTABLE (P) NON - POTABLE (NP) (INDICATE REASONS IF NON POTABLE)	GROUND WATER IRRIGATED AREA (APPROX. RANGE IN PERCENTAGE)	RECHARGE STRUCTURES SUITABLE & PRIORITY (PT = PERCOLATION TANK, CD = CHECK DAM, NB = NALA BUND, RW = RECHARGE WELL, DT = DESILTING OF TANK, RP = RECHARGE PIT, SD = SUBSURFACE DYKE, RS = RECHARGE SHAFT, ST = STORAGE TANK, SCM = SOIL CONSERVATION MEASURES)	REMARKS (PROBLEMS / LIMITATIONS)
CB111	Alluvium (Sand Dominant) (111)	Channel Bar (CB)	5 - 6 / 2	Excellant	LS	RW TW	5-10	400-500	Very High	P	42%	Not Required	Groundwater prospects very high with high recharge potential. Recharge structures not required.
PB111	Alluvium (Sand Dominant) (111)	Point Bar (PB)	6 / 1	Very Good	LS	RW TW	5-10	300-500	Very High	P	7%	Not Required	Groundwater prospects very high with high recharge potential. Recharge structures not required.
APY113	Panskura Formation (Early to Late Holocene): Alluvium (Sand and Silt) (113)	Alluvial Plain Younger (APY)	6.58 / DW - 1	Very Good	LS	DW / TW	10 - 12 / 20 - 30	125 - 150 m^3/day / 250 - 300 LPM	Very High	P	10%	Not Required	Aquifer is formed of Sandy part of alluvium. Recharge structures not required as good recharge conditions prevail
APO13	Sijua Formation (Lower Holocene): Alluvium (Sand,Silt and Clay) (13)	Alluvial Plain Older (APO)	2.43 - 11.97 / DW - 7 HP - 8	Good	LS	DW / TW	10 - 20 / 30 - 50	80 - 100 m^3/day / 175 - 200 LPM	High	P	Nil	Not Required	Aquifer is formed of Sandy part of alluvium. Recharge structures not required as good recharge conditions prevail
VFS211	Lalgarh/Illambazar Formation (Middle to Upper Pleistocene): Laterite (Ferricrete-hard crust, lateritic nodules and lithomerge clay) (211)	Valley Fill Shallow (VFS)	No wells observed	Moderate	LS Underlain by WM+FR	TW / BW	50 - 60	75 - 100 LPM	Moderate	P	Negligible	DT Moderate	Recharge structures will increase the sustainability of groundwater sources
LP211	Lalgarh/Illambazar Formation: Laterite (211)	Lateritic Plain (LP) (Lithomerge clay)	5.78 - 11.36 / DW - 6 HP - 2	Limited	WM+FR	DW / TW / BW	15 - 20 / 50 - 60	25 - 50 m^3/day / 50 - 100 LPM	Moderate	P	5%	RW / DT High	Areas of exposed lithomerge clay. Fracture zones form the aquifer,recharge structures will enhance groundwater development
DLU211	Lalgarh/Illambazar Formation: Laterite (211)	Dissected Lateritic Upland (DLU) (Hard crust and Lateritic nodules)	9.49 / DW - 1	Nil to moderate	WM+IR (Impervious material)	TW / BW	80 - 100	30 - 50 LPM	Low	P	Nil	Not Required	Essentially run-off zone where hard capping is present.Areas of nodular laterites are recharge zones with deep water table conditions.Primarily forest areas with sparse settlements.Not suitable for large scale development of groundwater
VFS34	Rajmahal Trap (Upper Jurassic to Cretaceous): Amygdaloidal Basalt (34)	Valley Fill Shallow (VFS)	No wells observed	Limited	LS Underlain by WM+FR	TW / BW	30 - 50	100 - 125 LPM	Moderate	P	20%	CD Moderate	More prospective than the other units within basaltic terrain, especially where lineament control persists
PLS34	Rajmahal Trap: Amygdaloidal Basalt (34)	Buried Pediplain Moderate (BPM)	No wells observed	Limited	WM+FR	DW / TW / BW	5 - 10 / 40 - 60	10 - 15 m^3/day / 75 - 100 LPM	Moderate	P	30%	RP Moderate	Weathered and fractured basalts form the aquifer.Large diameter dug wells will produce better yields
PLW34	Rajmahal Trap: Amygdaloidal Basalt (34)	Weathered Pediplain Shallow (PPS)	2.15 - 7.36 / DW - 4 HP - 1	Poor	FR	DW / TW / BW	10 - 15 / 40 - 60	5 - 10 m^3/day / 30 - 50 LPM	Low	P	Negligible	RP High	Limited scope for groundwater development except along fracture zones
VFS531	Gondwana Supergroup (Carboniferous to Jurassic): Sandstone & Shale with Coal bands (Raniganj Formation) (531)	Valley Fill Shallow (VFS)	No wells observed	Good	LS Underlain by WM+FR	TW / BW	20 - 25	75 - 100 LPM	Moderate	P	Nil	Not Required	Aquifer conditions modified by coal mining activities.Groundwater development may not be sustainable in the long run.Areas of piped water supply
PPS54	Gondwana Supergroup: Sandy Shale (Barren Measure) (54)	Weathered Pediplain Shallow (PPS)	No wells observed	Poor	FR	DW / TW / BW	5 - 10 / 40 - 60	< 5 m /day / 20 - 30 LPM	Low	P	Negligible	RW / DT High	Essentially run-off zones. Recharge structures may help in limited groundwater development
BPS532	Gondwana Supergroup: Sandstone & Shale with Coal bands (Barakar Formation) (532)	Buried Pediplain Shallow (BPS)	No wells observed	Moderate	WM+FR	DW / TW / BW	5 - 10 / 20 - 30	10 - 15 m^3/day / 30 - 50 LPM	Low	P	Negligible	RW / DT High	Aquifer conditions modified by coal mining activities.Groundwater development may not be sustainable in the long run.Areas of piped water supply
PPS532	Gondwana Supergroup: Sandstone & Shale with Coal bands (Barakar Formation) (532)	Weathered Pediplain Shallow (PPS)	No wells observed	Limited	FR	DW / TW / BW	5 - 10 / 20 - 30	5 - 10 m^3/day / 30 - 50 LPM	Low	P	Nil	Not Required	Aquifer conditions modified by coal mining activities.Groundwater development may not be sustainable in the long run.Areas of piped water supply
VFS832	Chhotanagpur Granite Gneiss Complex (Lower Proterozoic - 2300 - 2400 mill yrs.): Granitoid Gneiss (832)	Valley Fill Shallow (VFS)	10.7 / DW - 1	Moderate	LS Underlain by WM+FR	TW / BW	30 - 50	150 - 175 LPM	Moderate	P	30%	CD Moderate	Prospects inferred as no wells observed. Recharge condition is moderate with moderate groundwater prospects
BPM832	Chhotanagpur Granite Gneiss Complex: Granitoid Gneiss (832)	Buried Pediplain Moderate (BPM)	No wells observed	Limited	WM+FR	DW / TW / BW	5 - 10 / 40 - 50	15 - 25 m^3/day / 150 - 175 LPM	Moderate	P	40%	RP Moderate	Recharge structures will improve ground water prospects
BPS832	Chhotanagpur Granite Gneiss Complex: Granitoid Gneiss (832)	Buried Pediplain Shallow (BPS)	4.35 - 10.6 / DW - 7	Limited	WM+FR	DW / TW / BW	5 - 10 / 40 - 60	10 - 15 m^3/day / 75 - 100 LPM	Low	P	10%	RP High	Recharge structures will improve sustainability of groundwater sources
PPS832	Chhotanagpur Granite Gneiss Complex: Granitoid Gneiss (832)	Weathered Pediplain Shallow (PPS)	5.99 - 9.25 / DW - 4	Poor	WM+FR	DW / TW / BW	15 - 10 / 40 - 60	5 - 10 m^3/day / 30 - 50 LPM	Low	P	Negligible	RP High	Due to high run-off and poor infiltration, recharge structures are required to maintain sustainability of groundwater sources

F——F / —— / – – – *These are fault / fracture zones, which generally act as conduits for movement of ground water in hard rocks. Along these zones, the yields are significantly higher and wells are likely to be sustainable for longer duration. However, the inferred fractures need to be confirmed by detailed ground surveys.*

D——D / Q——Q / P——P These are dykes, quartz reefs and pegmatite veins, which generally act as barriers for ground water movement.

N.B.-The depth range and yield range of wells may vary within the unit because of certain inhomogeneities. Fractures/Lineaments which are clearly observed / inferred from the satellite image are indicated on the map. There could be some obscured fractures which also influence the ground water prospects. Locations of the recharge structures shown in the map are tentative. This map is useful for narrowing down the target zones,and exact location on the ground for wells and recharge structures should be identified based on follow-up ground hydrogeological/geophysical surveys.

GROUND WATER PROSPECTS INFORMATION

YIELD RANGE OF WELLS	COLOUR CODE	DEPTH RANGE OF WELLS: SHALLOW (< 30 METERS)	MODERATE (30 - 80 METERS)	DEEP (> 80 METERS)
> 800 LPM	VIOLET			
400 - 800 LPM	INDIGO			
200 - 400 LPM	BLUE			
100 - 200 LPM	GREEN			
50 - 100 LPM	YELLOW			
30 - 50 LPM	ORANGE			
20 - 30 LPM	BROWN			
10 - 20 LPM	PINK			
Prospects limited to valley portions only (Hills, Plateaus etc.)	RED			
Run-off zone/ Barrier for G.W. movement	RED	(Inselberg / Ridge / Dyke etc.)		

HYDROLOGICAL INFORMATION

DESCRIPTION	SYMBOL
CANAL / TANK IRRIGATED AREA	
GROUND WATER IRRIGATED AREA	
RIVER / STREAM (with sand)	
WATER BODY / SPRING	
CANAL	
RAIN GUAGE STATION (With average annual rainfall in mm)	800

RECHARGE STRUCTURES SUGGESTED

PERCOLATION TANK, NALA BUND, DESILTING OF TANK, SUBSURFACE DYKE, SOIL CONSERVATION MEASURES, CHECK DAM, RECHARGE WELL, RECHARGE PIT, RECHARGE SHAFT, STORAGE TANK

WELLS OBSERVED DURING FIELD VISIT

YIELD RANGE IN LPM	BORE / TUBE WELL	YIELD RANGE IN m^3/ day	DUG WELL / RING WELL
> 800 LPM	15/70	> 400 m^3 / day	8/15
400 - 800 LPM	15/70	200 - 400 m^3 / day	8/15
200 - 400 LPM	15/70	100 - 200 m^3 / day	8/15
100 - 200 LPM	15/70	50 - 100 m^3 / day	8/15
50 - 100 LPM	15/70	25 - 50 m^3 / day	8/15
30 - 50 LPM	15/70	15 - 25 m^3 / day	8/15
20 - 30 LPM	15/70	10 - 15 m^3 / day	8/15
10 - 20 LPM	15/70	5 - 10 m^3 / day	8/15
< 10 LPM	15/70	< 5 m^3 / day	8/15

Colour inside well symbol indicates yield range. The figures on the top right hand side of well indicate the depth to water level and depth of well in meters

DUG - CUM- BORE WELL, HAND PUMP WELL, ARTESIAN WELL, OBSERVATION WELL OF G.W DEPT. / C.G.W.B.

STRUCTURAL INFORMATION

DIPS	BEDDING	SCHISTOSITY/ FOLIATION
GENTLE (< 15)		
MODERATE (15 - 45)		
STEEP (45 - 80)		
SUB - VERTICAL TO VERTICAL (> 80)		

ANTICLINE / ANTIFORM

SYNCLINE / SYNFORM

TREND LINE

ESCARPMENT

LITHOLOGY / GEOMORPHIC UNIT BOUNDARY

	MINOR	MAJOR
FAULT	F——F	F——F
THRUST	T——T	T——T
FRACTURE / LINEAMENT		
FRACTURE / LINEAMENT (Inferred)		

SHEAR ZONE (Confirmed / Inferred) S——S / S– – S

DYKE (Confirmed / Inferred) D——D / D– – D

QUARTZ REEF (Confirmed / Inferred) Q——Q / Q– – Q

PEGMATITIE VEIN (Confirmed / Inferred) P——P / P– – P

Lithologic contacts are inferred at places & Geomorphic boundaries are gradational

BASE MAP INFORMATION

SYMBOL	DESCRIPTION
NH - 2	NATIONAL HIGHWAY
SH - 9	STATE HIGHWAY
	METALLED ROAD
	OTHER ROAD
	RAILWAY
	CITY / VILLAGE
	HABITATIONS : NON - COVERED (NC) PARTIALLY COVERED (PC)

BOUNDARY : STATE, DISTRICT, BLOCK

OTHER INFORMATION

Rainfall : 1431 mm

(Source IMD)

LOCATION INFORMATION

STATE INDEX — INDIA, WEST BENGAL

DISTRICT INDEX — A-BIRBHUM, B-BARDDHAMAN, C-PURULIYA, D-BANKURA, E-PASCHIM MEDINIPUR

BLOCK INDEX — A03 - NALHATI - I, A05 - RAMPURHAT - I, A09 - MAHAMMADBAZAR, A08 - MAYURESWAR - II

MAPSHEET INDEX

72P/7	72P/11	72P15
72P/8	72P/12	72P16
73M/5	73M/9	73M13

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