DRILLING CORE LOG

Hole No. CS-4 (1)

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 2

Location Caledonia Saddle 188,961.09N 192,487.22E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 30.55 m

Elevation 1364.810 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Underground Water Table m

Inclination

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) / p – q curve / q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1													Silty clay ~ clayey silt with quartz grains and gravels of φ 1~2mm.	
2			Talus		yel-brn									
3	1361.31													
4			chnk		pink-brn to yel-wht to yel-brn	hily-wd							Looks like silty sand, but retains rock texture; very easy to break with fingers due to heavy weathering. Weatheried mica rich at 5.0~6.15m. Quartz grains rich at 6.15~8.35m. Quartz grains rich at 8.35~9.15m. Core loss is very prominent at 9.15~10.10m; samples are fragmented; fragments are oxidized and discolored; very easy to break with light hammering.	
5														
6			bio-gn											
7														
8			chnk											
9														
10	1354.71				yel-brn									
	1354.20		bio-gn			wkly-wd							Open cracks 10° with iron stains at 10.18m.	
	1353.46		inter chnk										There are many cracks at various depths. Planes are coated with clay film and iron stains.	
12													Variations of rock facies are not prominent at 10.32~17.49m. Closed cracks of 60~80° at 12.00~12.13m. Closed cracks of 70°, 80° at 16.01~16.71m. Open crack at intervals of 2~7mm at 16.13~16.57m; planes have slickenside, striations and clay films. Closed crack of 45° at 16.84m.	
13														
14														
15														
16														
17						Fresh							Generally undulated at 17.49~24.09m; not so many cracks on the cores. Open cracks of 45°, 60° at 18.38~18.47m; planes are coated with clay films. No cracks on the cores at 18.47~22.46m. Open cracks 30° with fresh planes at 22.46m. Open crack 45° at 23.06m.with black film 1~1.5mm wide and thin calcite veins. Closed crack of 50° at 23.85m with black film under 1mm wide.	
18														
19			inter chnk											
20														
21														
22														
23													Undulated, but many cracks and hair cracks on the cores; partially fragmented. Closed crack 45° with black film at 24.55m. Open crack at 24.65m with slickenside and clay film. Hair cracks 45~90° in some portions at 24.65~25.10m. Open crack 30° at 25.11m. Prominent cracks 40°, 60° at 25.11~25.22m; plane of 40° crack has very prominent sickenside, striations. Open crack of 70° at 25.31~25.40m with slickenside, clay film and calcite vein. Many cracks of 40°, 50°, 70° at intervals of 3~10cm at 25.40~26.37m. Open crack 45°with slickenside and calcite vein.	
24														
25														
26														
27														
28														
29														
30														

DRILLING CORE LOG

Hole No. CS-4 ②

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 2 of 2

Location Caledonia Saddle 188,961.09N 192,487.22E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 30.55 m

Elevation 1364.810 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation 20 40 60 80%	Permeability Test: P (kg/cm) p-q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
31	1334.26												Closed cracks of 10~70° at intervals of 20~70cm at 26.37~28.72m. Core samples are fragmented at 28.72~29.05 due to many cracks of 60°, 70°, 80°; planes have slickenside, striations. Closed crack 45° at 29.12m. Open crack 80° at 29.18~29.38m with slickenside, striations and hair cracks 70~80°. Many cracks of 30°, 45°, 70°, 80~90° at intervals of 3~5cm at 29.38~29.77m. Open cracks 70°, 80° at 29.77~30.06m with planes colored black to dark brown. Hair cracks 70°, 30° at intervals of 2~3mm at 30.06~30.12m. No cracks on the cores at 30.12~30.55m.	
32														
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DRILLING CORE LOG

Hole No. CS-5

Name of Project: Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 1

Location: Caledonia Saddle 188,845.01N 192,448.33E

Depth of Bedrock: m

Bore Hole Dia: mm

Depth of Hole: 20.20 m

Elevation: 1338.195 m

Core Recovery: %

Type of Drill Machine:

Operator:

Direction:

Inclination:

Underground Water Table: m

Capacity of Pump: l/min

Supervisor:

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: p (kg/cm) – q (l/m·min) p-q curve	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1	1337.00		Talus		red-brn to yel-brn								Clayey silt with quartz grains.	
2			Talus		dark-brn to yel-brn	hily-wd							It is difficult to determine between the highly weathered rock and talus deposits. Very soft, easy to break with fingers.	
3			(hily-wd rock)											
4	1334.25													
	1333.90		Talus		yel-brn								Looks like old top soil; includes sub-angular gravel.	
	1333.70					hily-wd								
5	1333.07					wd							Samples are fragmented; fragments are a little undulated. oxidized and discolored.	
6	1331.52					wkly-wd							Undulated, tending to be discolored. Fragmented to short columnar shape at 6.15~6.50m. There are many cracks of 10~70° on the cores, some of them are open cracks with slickenside.	
7			inter chnk										Undulated at 6.68~7.71m. Open crack 60° with thin calcite vein at 7.48~7.55m. Includes lenses of felsic minerals and garnet grains at 7.71~10.38m. Open crack 30° at 7.77m. Open crack 60° at 7.91m with slikenside and clay film. Closed crack 70° at 8.09~8.21m with black film. Open crack 20° at 8.53m with calcite vein and chalcopyrite specks. Cracks 30°, 60°, 80°, 90° at 9.25~9.42m. Open crack 80° at 9.80~10.12m with vein and clay film. Open crack 70° at 11.04~11.16m with veins and pyrite specks.	
8														
9														
10														
11							Fresh							
12	1326.14													
13	1324.87		qtzte										Includes large biotite grains, partially porous. Open crack 20° at 12.10m with slickenside, striations asnd clay film; many cracks on the cores.	
14			inter chnk										Interbeded lenses of felsic minerals. Open crack 30° at 13.30m with slickenside and clay film. Open crack 20° at 13.57m with clay film. Closed cracks of 80°, 30° at 14.02~14.20m. Many cracks 70~90° at 15.08~15.96m; some of them are open with slickensidfe, striations and clay film.	
15														
16	1322.24													
	1321.86		bio-gn										Open crack 30°, 40°, 60°, 70° with slickenside and calcopyrite specks.	
17	1321.37		fels gn										Garnet rich. Open cracks 60~90° with clay film.	
18													Many cracks on the cores at 16.83~18.80m. Samples are fragmented~short columnar shape at 17.39~18.80m. There are not so many cracks below 18.80m. Cracks 80° at intervals of 2~20mm at 16.83~17.39. Open cracks 30°, 60° at 16.87~16.93m with slickenside and clay film. Open crack 45° at 17.11m with slickenside and clay film. Fragmented at 17.39~18.0m due to many open cracks with slickenside, striations and clay film. Many cracks of 60°, 70°, 80°, 90° at 18.0~18.17m; crack of 80° has black clay film 5mm wide with slickenside and striations. Open crack 80° at 20.08~20.20m with slikenside.	
19			inter chnk											
20	1318.00													
21														
22														
23														
24														
25														
26														
27														
28														
29														
30														

DRILLING CORE LOG

Hole No. CS - 6

Name of Project: Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 1

Location: Caledonia Saddle 188,934.95N 192,145.61E

Depth of Bedrock: m

Bore Hole Dia: mm

Depth of Hole: 17.15 m

Elevation: 1271.778 m

Direction

Inclination

Core Recovery: %

Underground Water Table: m

Type of Drill Machine

Capacity of Pump: l/min

Operator

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) / p – q curve / q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1					yel-brn								Mainly consists of silty clay. Includes highly weathered gravels below 3.90m; very easy to break with fingers.	
2														
3			Allu vium		red-brn									
4														
5					dark-brn									
6														
7	1264.93													
8			bio-gn	D	brn-yel	hily-wd	Soft						Generally, core samples are biotite rich; weathered to the core center; easy to break with fingers. Includes much muscovite in the samples below 7.5m.	
9	1262.86													
10			mafc-bd										Consists of mostly muscovite. Suggests that original rock was mafic band.	
	1261.58													
11			fels bd										Interbed of felsic band at 10.26~10.38m. Mafic band at 10.38~10.41m. Variation of rock facies is not prominent below 10.41m. Open crack 30° at 10.45m with iron stains and clay film. Closed crack of 80~85° at intervals of 2~4cm at 12.47m~12.71m. Open crack 50° at 13.70~13.75m with thin clay film. Open crack 10°, 20° at 13.75, 13.79m with clay film. Open crack 90° at core center at 13.79~14.85m with black film 1mm wide; looks like planeless fault.	
12														
13														
14			bio-gn											
15														
16	1256.00													
			inter chnk										Core samples are fragmented at 15.78~15.97m due to many cracks 30°, 60°, 80°; fragments havbe clay film along cracks. Closed cracks 60°, 80° at 15.97~16.11m. Short columnar cores 10~30mm wide at 16.11~16.21m; core samples are bounded with crack planes with slickenside, striations. Many cracks 20~45° on the cores at 16.21~16.82m; some of them are open with thin clay film; partialiy fragmented.	
17	1254.88													
	1254.63		bio-gn										Variation of rock facies is not prominent and there arte no prominent cracks.	
18														
19														
20														
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28														
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DRILLING CORE LOG

Hole No. CQ - 1 ①

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 2

Location Caledonia Quarry 189,321.70N 193,246.09E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 40.14 m

Elevation 1425.899 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) / q (l/m·min) p-q curve	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1	1424.40		Talus		red-brn								Sandyt silt with quartz grains.	
2	1423.20		inter chnk			Fresh Partially wd							Undulated; core samples are long columnnar shape Weathereed rock at 1.50~1.53m. Slightly weathered rock at 1.53~1.61m.	
3	1422.59		bio-gn										Interbed of intermediate charnockite at 2.84~2.92m. Includes lamellas of felsic minerals in some portions.	
4													Undulated at 3.31~7.11m, variation of rock facies is somewhat prominent. Mafic mineral rich at 3.39~3.45m. Interbed of biotite gneiss 20cm wide at 3.56~3.82m. Biotite gneiss 7cm wide at 4.07~4.17m. Biotite gneiss 6cm wide at 4.25~4.31m. Granitic to pegmatitic texture at 4.55~4.72m. Interbed of biotite gneiss at 4.72~4.80m. Includes lenses of felsic minerals at 4.80~4.86m. Interbeds of biotite gneiss 10~30mm wide at 4.86~7.11m. Open crack 40° at 3.41m with slickenside. Hair crack 70°, 90° at 3.88~3.98m, 4.55~4.65m.	
5														
6														
7														
8														
9														
10													Undulated at 7.11~13.98m, including biotite lamellas and interbeds of biotite gneiss. Interbed of biotite gneiss at 7.21~7.25m. Biotite gneiss 7cm wide at 7.34~7.46m. Biotite gneiss 1.5cm wide at 8.82~8.92m. Open crack 40° at 7.44m with slickenside and clay film colored pale green.	
11														
12			inter chnk			Fresh								
13														
14													Undulated at 13.98~24.19m; core samples are mostly long columnar shape; there are very few cracks and no open cracks. Interbed lenses of felsic minerals at 14.24~18.0m. Includes small lenses of felsic minerals at 18.0~20.84m. Includes lenses of felsic minerals, large biotite grains and biotite lamella at 20.84~24.19m. Closed crack 40° at 17.96m.	
15														
16														
17														
18														
19													Interbed of biotite gneiss 5~15cm wide at 24.19~26.94m. Interbed of felsic band at 25.6~25.84m with quartz, plagioclase and large biotite grains. Mafic minerals are slightly rich at 26.84~26.94m. Closed crack 70° at 25.60~25.76m. Closed crack 70° at 25.70~25.92m. Hair cracks of 30°, 70° and 90° at 26.85~27.00m.	
20														
21														
22														
23														
24														
25														
26														
27	1398.96													
	1398.56		Peg										Closed crack 60~70° at intervals of 2~5mm.	
28						Fresh							There are no cracks including hair cracks on the cores at 27.34~30.80m. Mafic minerals are slightly rich below 31.35m.	
29														
30														

DRILLING CORE LOG

Hole No. CQ - 1 ②

Name of Project: Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 2 of 2

Location: Caledonia Quarry 189,321.70N 193.246.09E

Depth of Bedrock: m

Bore Hole Dia: mm

Depth of Hole: 40.14 m

Elevation: 1425.899 m

Core Recovery: %

Type of Drill Machine:

Operator:

Direction:

Inclination:

Underground Water Table: m

Capacity of Pump: l/min

Supervisor:

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p-q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
31						Fresh							There are no cracks in this portion. Interbed of pegmatite at 31.66~32.50m. Granitic texture at 31.71m. Open crack 80° at 32.46~32.91m with thin clay film ; many hair cracks are along this crack. Interbed of biotite gneiss at 33.18~33.36m. Interbed of felsic band at 33.36~33.73m. Granititc texture at 33.73m. Interbeds of mafic band in some portions at 33.73~35.60m.	
32														
33														
34														
35	1390.30													
36			bio-gn										Interbeds of felsic minerals and intermediate charmockite . Open crack of 45° at 35.93~35.98m with slickenside.	
37	1389.15													
38			gra-gn										Core contains pegmatitic texture in some portions; cores are bounded by some cracks 45°, 50°, 70° at intervals of 10~20cm.	
39	1387.20													
40			inter chnk										Includes some lenses of felsic minerals at 38.70~39.11m. Mafic minerals are slightly rich at 39.11~39.83m. Pegmatitic texture at 40.00~40.14m. There are no prominent cracks on the cores.	
41	1385.76													
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DRILLING CORE LOG

Hole No. CQ - 2 ①

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 2

Location Caledonia Quarry 188,430.86N 193,424.44E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 40.08 m

Elevation 1355.958 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Underground Water Table m

Capacity of Pump l/min

Supervisor

Inclination

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm²) p – q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1													Sandy silt with weathered gravels φ 20~30mm.	
2														
3														
4			Talus		red-brn to yel-brn									
5														
6														
7	1349.25													
8			inter chnk										Core samples are cracky, weathered and discolored; samples are fragmented~columnar shape, partially columnar shape. Cores and fragments are undulated, but cores are lost in some portions. Pegmatitic texture at 8.21~8.40m. Interbed of granititic gneiss at 9.00~9.40m. Very difficult to determine original rock at 9.40~15.0m; there are many cracks of 45°, 60° which are very prominent; planes are coated with iron stains; core shows very prominent oxidization and discoloration along cracks.	
9			Peg											
			inter chnk											
10			gra-gn			hly-wd								
11														
12			inter chnk											
13														
14														
15	1340.93													
16			inter chnk										Core samples are columnar~long columnar shape, partially fragmented~short columnar shape; some cracks 45°, 60°; planes and the portions along cracks are oxidized and discolored; intervals of cracks are 5~20cm.	
17														
18	1338.33		fels gn										Oxidation and discoloration of cores are prominent; closed and open cracks of 45°, 60°, 70° at intervals of 5~15cm.	
19	1336.88		gra-gn											
	1336.36												Fragmented due to many cracks 45°, 70°, 80°.	
20			fels gn			wkly-wd							Interbed of intermediate charnockite at 20.18~20.42m. Granitic texture at 20.42~20.63m. Cracks of 30°, 45°, 70° at 19.60~20.18m with iron stains. Fragmented cores at 19.99~20.18m. Open crack of 70° at 21.01~21.10m with clay film.	
21	1334.41													
22			inter chnk										Undulated; some cracks 45°, 60°, 80° at intervals of 5~20cm; planes have slickenside, striations and iron stains. Fragmented due to cracks at 21.98~22.25m.	
23	1332.41													
24			fels gn										Interbed of mafic band at 24.46~24.71m; open crack 30° at the portions of mafic band.	
	1331.47													
25	1331.14													
26			inter chnk										Biotite rich at 25.50~25.76m. Garnet rich at 25.80~25.97m; interbed of mafic band 5~10mm wide. Fragmented at 25.38~25.55m with clay film.	
	1329.29													
27			fels gn			Fresh							Garnet grains rich at 28.30~29.59m; interbeds of mafic band and intermediate charnockite. Some cracks of 60~70°, 90° at 26.73~27.11m; some of them open with clay film. Cracks of 70°, 90° at 27.50~28.11m; 70° cracks are open with clay film. Open crack 30° at 28.91m with slikenside and clay film.	
28														
29														
30														

DRILLING CORE LOG

Hole No. CQ - 2 ②

Name of Project: Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 2 of 2

Location: Caledonia Quarry 188.430.86N 193,424.44E

Depth of Bedrock: m

Bore Hole Dia: mm

Depth of Hole: 40.08 m

Elevation: 1355.958 m

Core Recovery: %

Type of Drill Machine:

Operator:

Direction:

Inclination:

Underground Water Table: m

Capacity of Pump: l/min

Supervisor:

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) / p - q curve / q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
31	1325.23												Open crack 30°, 45° at intervals of 6~8cm at 29.85~30.30m. Open crack 60° at intervals of 5~15cm at 30.65~30.83m with slickenside and clay film.	
	1324.70		gra-gn										Some cracks 70°, one of which is open with fresh plane.	
32													Generally, mafic minerals are rich; interbed of felsic band 1~4cm wide. Interbed of felsic gneiss at 34.46~34.84m with garnet grains and large biotite grains. Open crack 30° at 34.88m; planes are colored black~dark green. Open cracks 30°, 60° at intervals of 30~40cm at 35.34~36.36m; some closed cracks 70°, 80° cross some cracks 30°, 60°, but these are few.	
33														
34			inter chnk											
35						Fresh								
36														
	1319.45													
37			bio-gn										Interbeds of mafic band and felsic band in some portions. Fragmented~short columnar shape at 36.90~37.14m due to concentration of many cracks with clay film.	
	1318.49													
38													Interbed of biotite gneiss 7cm wide at 38.35~38.43m. Interbed of biotite gneiss 13cm wide at 38.63~38.77m. Open cracks 30° at 37.85m with clay film. Closed cracks 70° at 38.63~38.81m. Core samples are short columnar shape ~ fragmented at 38.81~40.08m due to many cracks of 45°, 60°, 80°. Crack planes have slickenside and striations, and are coated with clay film and calcite.	
39			inter chnk											
40	1315.88													
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
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59														
60														

DRILLING CORE LOG

Hole No. CP - 1 ①

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 6

Location Caledonia Power Station
190,754.96N
190,614.24E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 150.50 m

Elevation 1299.214 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p - q curve / q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1	1298.36		Talus										Clayey soil with organic matter.	
2–6					yel-wht to yel-brn								Clayey silt with weathered gravels. Yellowish white decomposed gneissic rock at 0.85~2.65m. Yellowish brown decomposed gneissic rock at 2.65~4.50m. Grayish in color at 4.50~5.50m; decomposed micacious gneissic rock. White to brown decomposed rock at 5.50~6.70m.	
7	1292.51													
8–9			chnk (gn)			hily-wd							Intermediate, fine to medium grained; discolored; main components are quartz, feldspar, hornblende and hypersthene.	
10	1288.98													
11	1287.93		bio-gn			wd							Inclined weathered joint at 10.8m, 11.28m; medium to coarse grained.	
12	1286.60		inter chnk			wkly-wd							Inclined weathered joint at 12.0m Inclined weathered joints at 12.28m, 12.31m, 12.61m.	
13–30			inter chnk			Fresh							Intermediate charnockite (gneiss); granitic texture; coarse grained; main components are quartz, feldspar, and hypersthene. Inclined foliation, chloriticized joints at 13.74m, 14.20m, 14.45m and 15.77m; joint plane has slickenside at 15.44m. Inclined foliation, chloriticized joint at 19.67m. Inclined chloriticized joints at 20.33m, 21.19m, 21.77m and 21.97m. Tight vertical joint, chloriticized from 21.27~21.57m. Inclined foliation joints at 22.71m (slightly altered). Inclined foliation joints chloriticized at 23.40m, 23.74m and 24.67m. Horizontal foliation, slickensided, chloriticized joints at 24.12m, 24.20m, 24.25m, 24.27m 24.30m. Inclined chloriticized, slickensided, foliation joint at 25.77m. Sub-vertical chloriticized foliation joint at 26.84m. Sub-vertical chloriticized, slickensided, foliation joint at 28.85m. Inclined chloriticized joints at 32.45m, 33.41m.	

DRILLING CORE LOG

Hole No. CP - 1 ②

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 2 of 6

Location Caledonia Power Station 190,754.96N 190,614.24E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 150.50 m

Elevation 1299.214 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p-q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
31–60		inter chnk		fresh									Inclined, chloriticized, foliation joint at 32.55m. Sub-vertical chloriticized joint at 32.97m. Inclined, chloriticized, foliation joint at 36.28m, 36.43m, and 36.60m. Inclined chloriticized joints at 36.36m, 37.60m and 39.30m. Inclined, chloriticized, foliation joints at 39.16m, 39.40m, 39.62m, 39.74m, 40.51m, 40.52m, 40.54m, 41.37m, 42.42m, 42.95m. Inclined chloriticized joint at 41.15m. Horizontal, slickensided, chloriticized joint at 43.18m. Inclined chloriticized joint at 43.67m. Inclined, chloriticized, foliation joints at 45.53m, 45.87m, 46.10m, 46.42m, 46.50m, 47.42m; some of which have slickenside. Sub-vertical chloriticized joints at 46.61m and 46.65m. Inclined chloriticized joints at 47.21m and 47.75m.	
50–54													Intermediate; predominently granulitic texture; coarse grained; main components are quartz, feldspar, garnet, biotite and pyroxenes. Inclined chloriticized joint at 53.79m. Horizontal, chloriticized, foliation joints at 53.94~54.29m.	
1244.48														
55–60		mela inter chnk											Basic~intermidiate; granulitic texture; coarse grained; main components are quartz, feldspar and pyroxenes. Horizontal, chloriticized, foliation joints at 56.20m, 56.68m, 56.96m, 57.21m, 57.66m and 57.76m. Vertical, chloriticized, tight joints at 56.70~57.40m and 58.52~58.94m. Inclined chloriticized joint at 61.52m.	

DRILLING CORE LOG

Hole No. CP - 1 ③

Name of Project: Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 3 of 6

Location: Caledonia Power Station 190,754.96N 109,614.24E

Depth of Bedrock: m

Bore Hole Dia: mm

Depth of Hole: 150.50 m

Elevation: 1299.214 m

Core Recovery: %

Type of Drill Machine:

Operator:

Direction:

Inclination:

Underground Water Table: m

Capacity of Pump: l/min

Supervisor:

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p - q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
61–66	1232.86		mela inter chnk										Basic~intermediate. Sub-vertical chloriticized joints at 61.52m. Vertical, chloriticized, slickensided joint at 60.82~61.39m. Inclined, chloriticized, foliation joint at 61.59m, 61.87m, 62.33m (with slickenside), 62.89m, 63.10m, 63.38m, 63.67m, 63.95m, 64.34m, 64.47m (with slickenside), 64.68m, 65.33m, 65.63m, 65.86m. Inclined, chloriticized joint at 62.47m. Vertical, chloriticized, slickensided joints at 62.17~62.61m, 63.67~64.08m, 65.06~65.30m, 66.02~66.35m.	
67–68	1230.47		inter chnk										Intermediate, granulitic texture; coarse grained; main components are quartz, feldspar, garnet, biotite and pyroxenes. Inclined, chloriticized joint at 67.10m. Vertical, chloriticized joint at at 67.43~67.65m.	
69–90			mela inter chnk										Basic~intermediate; granulitic texture, medium~coarse grained; main components are quartz, feldspar and pyroxenes. Inclined, chloriticized, foliation joints at 68.57m, 69.36m, 70.12m, 70.40m, 70.94m (with slickenside), 72.85m, 73.99m. Horizontal chloriticized joints at 71.79m and 71.90m. Inclined, chloriticized joint at 75.87m. Inclined, chloriticized joints at 80.33m and 81.13m. Inclined, chloriticized, foliation joints at 84.33m, 86.49m and 86.90m. Inclined, chloriticized, slickensided joints at 89.14m. Horizontal, chloriticized, slickensided joint at 89.17m.	

DRILLING CORE LOG

Hole No. CP - 1 ④

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 4 of 6

Caledonia Power Station
190,754.96N
Location 190,614.24E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 150.50 m

Elevation 1299.214 m

Core Recovery %

Type of Drill Machine

Operator

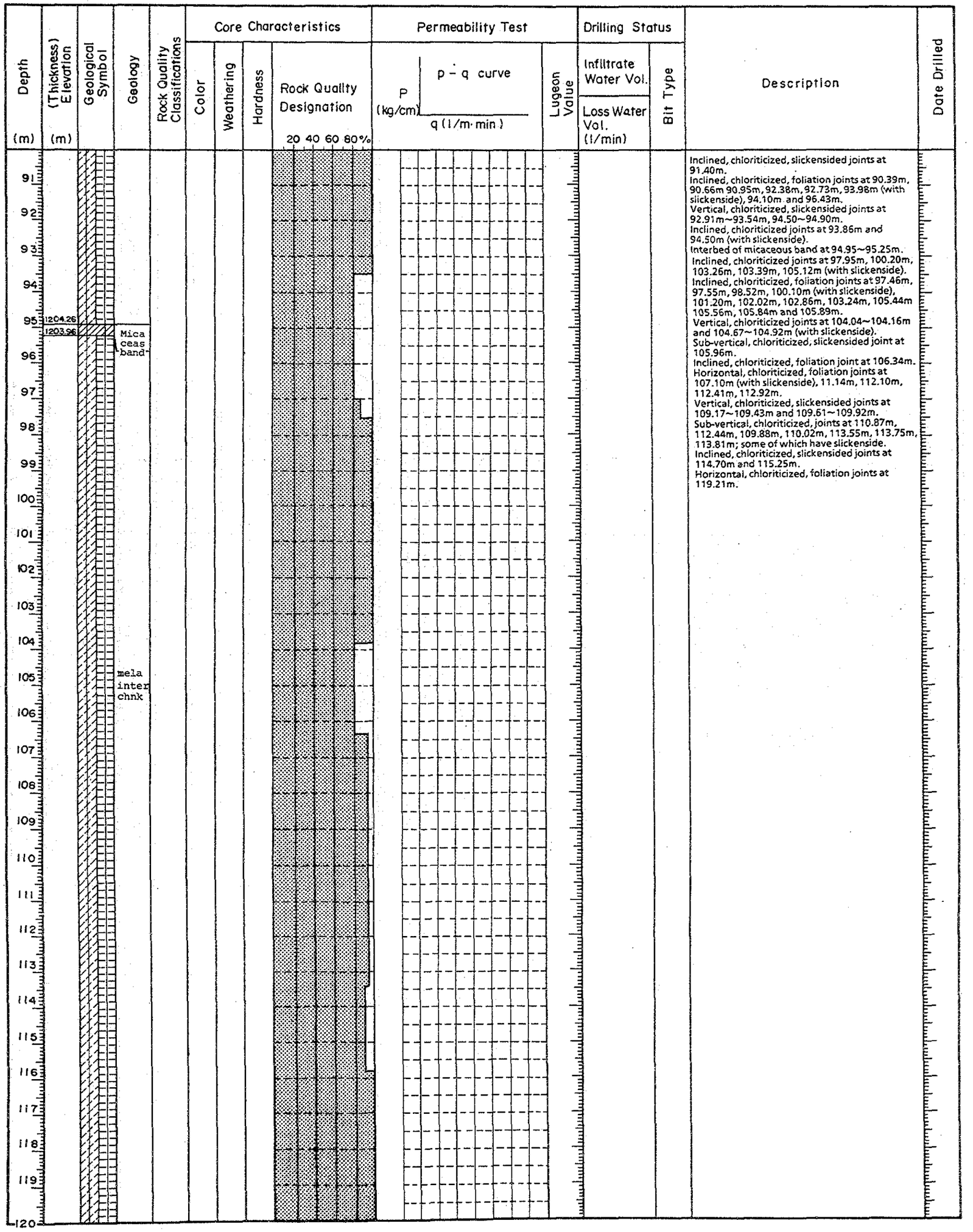
Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor



Inclined, chloriticized, slickensided joints at 91.40m.
Inclined, chloriticized, foliation joints at 90.39m, 90.66m 90.95m, 92.38m, 92.73m, 93.98m (with slickenside), 94.10m and 96.43m.
Vertical, chloriticized, slickensided joints at 92.91m~93.54m, 94.50~94.90m.
Inclined, chloriticized joints at 93.86m and 94.50m (with slickenside).
Interbed of micaceous band at 94.95~95.25m.
Inclined, chloriticized joints at 97.95m, 100.20m, 103.26m, 103.39m, 105.12m (with slickenside).
Inclined, chloriticized, foliation joints at 97.46m, 97.55m, 98.52m, 100.10m (with slickenside), 101.20m, 102.02m, 102.86m, 103.24m, 105.44m 105.56m, 105.84m and 105.89m.
Vertical, chloriticized joints at 104.04~104.16m and 104.67~104.92m (with slickenside).
Sub-vertical, chloriticized, slickensided joint at 105.96m.
Inclined, chloriticized, foliation joint at 106.34m.
Horizontal, chloriticized, foliation joints at 107.10m (with slickenside), 11.14m, 112.10m, 112.41m, 112.92m.
Vertical, chloriticized, slickensided joints at 109.17~109.43m and 109.61~109.92m.
Sub-vertical, chloriticized, joints at 110.87m, 112.44m, 109.88m, 110.02m, 113.55m, 113.75m, 113.81m; some of which have slickenside.
Inclined, chloriticized, slickensided joints at 114.70m and 115.25m.
Horizontal, chloriticized, foliation joints at 119.21m.

DRILLING CORE LOG

Hole No. CP - 1 ⑤

Name of Project: Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 5 of 6

Location: Caledonia Power Station 190,754.96N 190,614.24E

Depth of Bedrock: m

Bore Hole Dia: mm

Depth of Hole: 150.50 m

Elevation: 1299.214 m

Core Recovery: %

Type of Drill Machine:

Operator:

Direction:

Inclination:

Underground Water Table: m

Capacity of Pump: l/min

Supervisor:

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm²) p - q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
121													Horizontal, chloriticized, foliation joints at 120.06m, 120.51m, 121.84m, 121.86m. Sub-vertical, chloriticized, joints at 129.56m (tight) and 129.92 (with slickenside). There are no prominent joints from 121.86~129.56m.	
122														
123														
124														
125			mela inter chnk											
126														
127														
128														
129														
130														
131	1168.41												Intermediate; coarse grained granitic texture predominant; main components are quartz, feldspar and pyroxenes. Inclined, chloriticized joints at 131.16m, 131.25m, 131.47m and 131.96m. Inclined, chloriticized, slickensided joints at 132.14m, 132.16m, 132.18m, 132.24m, 132.40m, 132.42m, 132.50m, 132.52m, 132.54m. Sub-vertical, chloriticized, slickensided joints at 133.08m, 133.14m and 133.16m. Tight vertical joints at 133.16~133.50m and 133.66~133.89m. Inclined, chloriticized joints at 139.26m and 139.38m. Vertical, chloriticized, slickensided joint at 139.42~139.72m. Horizontal, chloriticized, altered joint at 141.83m. Horizontal, chloriticized, foliation joint at 143.25m (with slickenside) and 144.20m. Horizontal, chloriticized, foliation joints at 164.47m (altered), 146.53m, 148.03m, 148.21m. Inclined, chloriticized joint at 148.72m. Horizontal, chloriticized, foliation joints at 149.28m and 149.37m. Tight vertical joint from 149.54 to 149.81m.	
132														
133														
134														
135														
136														
137														
138														
139			inter chnk											
140														
141														
142														
143														
144														
145														
146														
147														
148														
149														
150														

DRILLING CORE LOG

Hole No. CP - 1 ⑥

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 6 of 6

Location Caledonia Power Station 190,754.96N 190,614.24E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 150.50 m

Elevation 1299.214 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p - q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
	1148.71													
151														
152														
153														
154														
155														
156														
157														
158														
159														
160														
1														
2														
3														
4														
5														
6														
7														
8														
9														
0														
1														
2														
3														
4														
5														
6														
7														
8														
9														
0														

DRILLING CORE LOG

Hole No. CC - 1 ①

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 3

Location Caledonia Surge Chamber 190,717.03N 190,746.34E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 70.40 m

Elevation 1340.131 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) / p – q curve / q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
0	1339.43		Soil		brn								Brownish gravelly soil with highly weathered rock pieces.	
1	1338.88				wht								Decomposed rock, whitish in colour.	
2					yel to brn	very hily-wd							Acidic, yellowish to brownish in colour, main components guarz, feldspar, hornblende, biotite, garnets. Very highly weathered.	
3														
4														
5	1334.56		fels gn											
6					brn	hily-wd							Acidic, predominantly granulitic texture, main component quartz, feldspar, garnets, biotite and hornblende.	
7														
8	1332.28					wd							Acidic, granulitic texture, main components, quartz, feldspar and pyroxeme. Inclined foliation joints with iron stains and weathered at 8.00, 8.05, 8.24, 8.27, 8.33, 8.42 and 8.55m.	
9	1330.99													
10			bio-gn			Fresh							Coarse grained, main components quartz feldspar, hornblende, biotite, garnets. Sub-vertical iron stained, weathered joints at 9.23 and 9.85m. Inclined foliation joints at, 10.05, 10.46M; iron stained, weathered. chloriticized at 10.30m. iron stained at 10.50, 10.57, 10.66, 11.00m.	
11	1329.06													
12														
13														
14														
15														
16														
17														
18														
19														
20			inter chnk										Predominantly granulitic texture, coarse grain, main components, quartz, feldspar and pyroxeme. Inclined foliation joints at11.61 (iron stained), 13.45 (fresh), 14.37 (slickensided, chloriticized), 14.57 (fresh), 15.20m (iron stained). Sub-vertical joints at 14.43 (iron stained, slightly altered), 14.62 (slickensided, chloriticized), 14.70m (slickensided, chloriticized). 15.51 (iron stained, slightly altered). Vertical iron stained, chloriticized, tight joint from 9.85 to 10.45m and from 15.65 to 16.13m. Inclined foliation joints at 16.13, 16.55, 17.95, 18.07, 18.10, 19.48, 19.53, 19.66m; slickensided and chloriticized. Sub-vertical tight joint at 16.95 and 17.07m. Inclined joints at 19.18 (slickensided, chloriticized), 19.57 (slickensided, chloriticized), 19.68m (chloriticized). Sub-vertical, slickensided, chloriticized joints at 21.03, 21.08, 21.13, 21.20, 21.26m. Slickensided, chloriticized at 19.18m. Slickensided, chloriticized at 19.57m. Chloriticized at 19.68m. Sub-vertical, slickensided, chloriticized joints at, 21.03, 21.08, 21.15, 21.20, 21.26, and 21.33m. Inclined foliation joints at 22.25m; slickensided, chloriticized. Vertical joints, slickensided, chloriticized at 17.11~17.35m, 17.41~17.65m, 21.58~21.88m. Fresh garnet, hornblende, biotite gneiss band from 21.88 to 22.24m. Inclined foliation joints at 25.85 (slickensided, chloriticized), 28.86 (slickensided, chloriticized), 27.96 (chloriticized), 29.02 (chloriticized). Inclined iron stained joint at 29.65m. Garnet, hornblende, biotite gneiss band from 19.05 to 29.71m.	
21														
22	1318.25													
23	1317.89													
24														
25														
26														
27														
28														
29	1311.08													
30	1310.42													

DRILLING CORE LOG

Hole No. CC - 1 ②

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 2 of 3

Location Caledonia Surge Chambre 190,717.03N 190,746.34E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 70.40 m

Elevation 1340.131 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) / p – q curve / q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
31													Sub-vertical joint at 30.24m; slickenside, chloriticized. Inclined joints at 29.72 (slickensided, chloriticized), 30.30m (slickensided, chloriticized). Hornblende, biotite gneiss band from 31.53 to 31.88m. Inclined foliation joints at 33.65, 33.80, 33.91m with iron stain. Slickensided, chloriticized at 33.74, 33.87m. Vertical joint, slickensided, chloriticized from 34.04 to 34.56m. Sub-vertical joint at 36.92 (slickensided, chloriticized), 38.32 (slickensided, chloriticized), 39.69 (chloriticized), 39.85 (chloriticized). Inclined foliation joints with slickenside at 38.19, 38.66, 38.68, 38.71, 39.78, 39.49m. Vertical tight joint from 41.75 to 42.35m. Inclined foliation joints at 41.75 to 42.20, 42.77, 42.82m. Garnet, hornblende, biotite gneiss band from 42.25 to 43.18m. Vertical joint, slickensided, chloriticized from 43.58 to 44.41m. Inclined joints at 43.07 (slickensided, chloriticized), 45.50 (chloriticized), 46.35 (chloriticized), 46.52 (fresh). Two sub-vertical joints, slickensided, chloriticized at 47.10m. From 45.76 to 46.00m, vertical joint, slickenside, chloriticized, crossed cut with two horizontal joints. Vertical joints, slickenside, chloriticized from 47.27 to 47.65m, from 47.82 to 48.28m. Inclined foliation joints, slickended, chloriticized, at 47.36, 47.48, 47. 57, 47.64m. Inclined joints at 48.60, 49.41m (slickensided, chloriticized), 48.80, 48.85, 49.58, 49.94 (chloriticized). Sub vertical joints at 48.60, 50.48m (slickensided, chloriticized). From 51.75 to 52.45m, garnet, biotite gneiss band.	
32	1308.60													
	1308.25													
33														
34														
35														
36														
37														
38														
39														
40			inter chnk											
41														
42	1297.88													
43	1296.95													
44														
45														
46														
47														
48														
49														
50														
51														
52	1288.38													
	1287.68													
53			fels gn										Predominantly granulitic texture, coarse grained, main components, quartz, feldspar, pyroxeme and garnets. Inclined joint at 51.46m; chloriticized Subvertical joint at 51.79; chloriticized. Vertical joint from 52.25 to 52.45m, chloriticized, slightly altered.	
	1286.67													
54														
55														
56			gra- gn	pink									Garnetiferous, foliated, banded, main components quartz, feldspar, garnets, biotite. Vertical joint from 55.25 to 55.80m; slickensided and slightly altered. Sub-vertical joint at 58.05m; slickensided, chloriticized.	
57														
58														
	1281.50													
59			inter chnk										Intermediate, granulitic texture, coarse grained, main components quartz, feldspar, and pyroxeme.	
60														

DRILLING CORE LOG

Hole No. CC - 1 ③

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 3 of 3

Location Caledonia Surge Chamber 190,717.03N 190,746.34E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 70.40 m

Elevation 1340.131 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) / q (l/m·min) p-q curve	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
61													Inclined joint, slickensided, chloriticized, at 68.69m. Vertical joint from 69.72 to 70.02m, chloriticized with pyrite, bluish alteration.	
62														
63														
64														
65														
66	inter chnk													
67														
68														
69														
70	1269.73													
1														
2														
3														
4														
5														
6														
7														
8														
9														
0														
1														
2														
3														
4														
5														
6														
7														
8														
9														
0														

DRILLING CORE LOG

Hole No. TD-1 ①

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 2

Location Talawakelle Dam 190,063.49N 187,937.73E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 30.81 m

Elevation 1239.079 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p – q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1	1238.19		Talus		yel-brn								Comprising quartz grains and gravels, Ø2.8m/m.	
2			inter chnk	D	pink-wht to yel-brn	hily-wd							Rock texture remains, very easy to break with fingers.	
3	1236.34													
4			inter chnk			wd							*Core samples are fragmental and short* columnar shape, very easy to break with light hammering. Cores are oxidized and discolored. Inclined vertical joints, oxidized, at intervals of 1~10cm.	
5														
6	1232.76													
7	1232.10		inter chnk			wkly-wd							Columnar ~ long columnar shape core samples are almost fresh.	
8													Generally variation of rock facies is not prominant at 7.04~12.19m; comprising garnet grains. Inclined foliation joints 20° at intervals of 2~15m/m at 7.46~7.52m. Vertical joints and inclined joints at intervals of 5~10m/m at 7.90~8.48m. Vertical hair cracks at intervals of 1~6m/m at 9.50~9.5m. There are no variation of rock facies at 12.19~17.85m. Open joints are few. Inclined joints 20°~30°, chloriticized, at 14.10m, 15.65m, 17.58m. Vertical joint 80° with slickenside at 17.60m~17.86m. Vertical joint 80°, chloriticized at 17.75~17.87m. Main components quartz, feldspar, biotite; predominantly granulitic texture at 21.64~22.20m. Vertical joints 80°~90° with clay film at 17.88~18.41m. Inclined tight joint at 21.61m. Open joint 10°, 20°, 30°, 35° at 23.93m, 27.79m, 27.89, 29.00m; some of them chloriticized. Inclined hair cracks 30° at 28.17m. Vertical hair cracks at 28.75~29.13m. Vertical joint 80° at 29.00~29.13m. There is little variation of rock facies at 29.49~30.58m.Inclined joints 35° at 30.81m, chloriticized.	
9														
10														
11														
12						Fresh								
13														
14														
15														
16														
17														
18														
19														
20			inter chnk											
21														
22														
23														
24														
25						Fresh								
26														
27														
28														
29														
30														

DRILLING CORE LOG

Hole No. TD - 1 ②

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 2 of 2

Location Talawakelle Dam 190,063.49N 187,937.73E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 30.81 m

Elevation 1239.079 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) / p – q curve / q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
31	1208.50 – 1208.27		mela chnk											
32														
33														
34														
35														
36														
37														
38														
39														
40														
41														
42														
43														
44														
45														
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DRILLING CORE LOG

Hole No. TD - 2

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 1

Location Talawakelle Dam 193,076.72N 187,847.49E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 19.63 m

Elevation 1199.448 m

Direction

Inclination

Core Recovery %

Underground Water Table m

Type of Drill Machine

Capacity of Pump l/min

Operator

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p – q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
0	1199.04		Soil		yel-brn								Gravelly soil, comprised of gravels 2~10m/m.	
1					red-brn to brn-wht	hily-wd							Rock texture remains, gravelly, very easy tobreak with light hammering, rock samples are oxidized and discolored along the joint planes, inclined joints 60°, oxidized, discolored.	
2														
3														
4	1195.77 / 1195.47				brn	wd							Inclined joints 60° at 3.68~3.96m, oxidized, discolored.	
5						Fresh wd							Rock samples are undulated; thin interbeds of basic charnockite and mafic band. Inclined~vertical joint at 5.31~5.44m, oxidized and discolored, with iron stains. Inclined joint 30° at 6.25m, slightly weathered. Horizontal joint 10°, slightly weathered at 6.83m. Vertical tight joint 75°~80° at 6.30~6.80m, with clay film under1m/m wide. Dip 20° at 6.71~12.70m. There are no open joints in this area, core samples are separated from mafic rich portions. Open joint with slickenside at 11.30m. Inclined joints 60° at 11.02~11.08m. Inclined joint 20° at 11.28m. Vertical hair cracks at 11.68~11.76m, 12.19~12.31m. Inclined open joint 20° at 16.46m. Vertical joint 70° at 17.47~17.57m, chloriticized, and sightly altered. Vertical foliation joints at intervals of 40m/m at 16.26~17.56m. No prominent joint at 17.56~18.59m. Interbeds of felsic gneiss at 19.00~19.35m. Granitic gneiss at 19.35~19.63m; main components are quartz, plagioclase and alkali-feldspar, biotite, garnet.	
6														
7														
8														
9			inter chnk											
10														
11						Fresh								
12														
13														
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19														
20	1179.82													
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30														

DRILLING CORE LOG

Hole No. TD - 3

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 1

Location Talawakelle Dam 193,063.49N 187,937.73E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 19.99 m

Elevation 1195.380 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation 20 40 60 80%	Permeability Test: P (kg/cm) p-q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1					pink-brn to yel-brn								Mainly sandy clay with quartz, biotite grains and weathered gravelsØ2~10m/m.	
6	1188.83		Talus											
7						hily-wd							Gravelly sand partially fragmental. Fragments are very easy to break with fingers, oxidized and discolored.	
8	1187.55													
9					yel-brn	wd							Fragmental~columnar shape, moderately undulated but oxidized and discolored, inclined joints 10°~20° in some sections.	
10	1186.01					hily-wd							Fragmental~short columnar shape, inclined and vertical open joint with iron stains and discolored.	
11	1184.84					wkly-wd							Inclined open joint, oxidized and altered at 11.30m. Horizontal open joint 10° at 11.45m.	
12	1183.92		inter chnk			Fresh							Dip 20° at 11.45~16.94m, interbeds of basic charinockite and mafic band. Inclined joint 50° at 13.08~13.26m. Horizontal foliation joint 10° at 13.56~15.14m, chloriticized. *Inclined-vertical joints at intervals of 40m/m,* chloriticized at 15.11~15.54m. Horizontal chloriticized joints at intervals of 20~30cm at 15.54~16.94m. Interbeds of biotite shist 20m/m, 80m/m wide in some portions. at 16.94~19.99m. There are many joints on the core. Inclined foliation, chloriticized open joints at intervals of 25~30m/m at 16.94~18.24m. Inclined joint 20°, chloriticized at 19.05m. Inclined joint 50° at 19.46m. Horizontal inclined chloriticized joints at intervals of 5m/m, slightly altered at 19.99m.	
20	1175.39													
30														

DRILLING CORE LOG

Hole No. TD - 4

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 1

Location Talawakelle Dam 193,076.72N 187,847.49E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 28.96 m

Elevation 1206.143 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Underground Water Table m

Capacity of Pump l/min

Supervisor

Inclination

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p-q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1	1204.85		Soil		red-brn to yel-brn								Gravelly soil, comprising gravels Ø2~20m/m.	
2 3	1202.79		Talus										Silty~sandy clay with gravels Ø2~30m/m gravels are mainly weathered charnockite.	
4 5 6 7 8 9 10			inter chnk		yel-brn to wht-brn	wd							Generally, core samples are fragmental~columnar shape, partially long columnar shape. Samples are oxidized, discolored, many open joints on the core, inclined~vertical joints with iron stains. Slightly weathered rock at 7.39~8.28m. ; Inclined~vertical foliation joints at 9.17~9.96m, cores are fragmental with iron stains. Sub-vertical joint on the long columnar shape core with oxidized zone.	
11	1195.27					wkly-wd							Inclined jonts 20° at 12.39~12.65m, fragmental core, oxidized and discolored. Inclined joints 40°~50° at 12.88~12.99m, oxidized and discolored.	
12 13	1193.16													
14 15 16 17 18						Fresh							Generally, variation of rock facies is prominent, thin interbeds of basic~acidic charnockite. Horizontal chloriticized joint 10° at 14.76m, Inclined joint 30° at 15.70m, slightly altered. Vertical foliation joints at intervals of 1~3m/m at 17.09~17.42m. Inclined joint 50° at 18.06m, slightly weathered. Sub-vertical joint 70°, at intervals of 70° at 18.11~18.34m.	
19 20 21 22 23	1187.50 1182.65		fels gn										Interbeds of basic~intermediate charnockite in some sections. Sub-vertical joint at 18.97~19.18m with iron stains and oxidized, cores are fragmental. Comprising much garnet at 20.50~20.56m, 21.44~21.84m. Inclined joints 10°, 30° at 19.51m, with iron stains. Inclined open joints 45°, 70° at 20.73~21.34m, cores are fragmental~short columnar shape, chloriticized. Vertical joint 80° at 21.84~22.05m, chloriticized . Core samples are fragmental~columnar shapes at 22.30~23.49m because of 30°, 45°, 60° joints at intervals of 4~15m, chloriticized.	
24 25 26 27 28 29 30	1177.18		inter chnk										Interbeds of basic charnockite, felsic gneiss in some sectioms. Inclined joints 40°, 70° at 23.67~23.88m, chloriticized. Inclined joint 20° at 26.42m, chloriticized. Inclined~vertical open joints at 27.36~27.89m, oxidized and discolored, core samples are fragmental.	

DRILLING CORE LOG

Hole No. TD - 5 ①

Name of Project: Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 2

Location: Talawakelle Dam, 192,748.73N, 187,893.87E

Depth of Bedrock: m

Bore Hole Dia: mm

Depth of Hole: 30.58 m

Elevation: 1200.600 m

Core Recovery: %

Type of Drill Machine:

Operator:

Direction:

Inclination:

Underground Water Table: m

Capacity of Pump: l/min

Supervisor:

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) / p – q curve / q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1–3	1197.32		Talus		red-brn								Sand at 0~0.6m; consists of quartz grains (Ø2~10m/m) Sandy clay with Ø2~40m/m gravels and quartz grains at 0.6~3.28m. Gravels are mainly weathered~highly weathered charnockite.	
4–14	1186.27		chnk		red-brn ≀ yel-brn ≀ dark-brn ≀ wht	hily-wd	Soft						Generally cores are highly weathered at 3.28~9.35m, but rock texture remains; cores are easy to break with fingers; in some portions there are weathered rocks which appear like gravel; these are easy to break with light hammering. Highly weathered charnockite at 9.35~14.33m, cores are weathered upto core center, rock texture remains in the core. There are weathered rocks which appear like gravel in some sections. Many quartz grains are included under 11.81m.	
15–16	1184.62		Acid-chnk		wht to yel-wht	wd	mode rately hard						Cores are short columnar to columnar shapes, garnet and biotite are oxidized. There are many open cracks on the cores (10°, 30°, 60°, 70°); planes are discolored and coated with iron stains.	
17–26	1174.46		inter chnk				soft to slty hard						Cores samples obtained in angular fragments of different sizes and short columnar shapes. The portions of columnar shape are slightly hard rock; but there are many open cracks 30°~40° and many hair cracks 40°~45° on the cores. Fragmental cores show very prominent oxidization. Sometimes fragments have crack planes coated with iron stains. Columnar cores are easy to break with light hammering, partial fragments and columnar cores are easy to break with fingers. Quartz grains rich at 20.30~20.35m; 24.1~24.38m.	
27–28	1172.00		mela chnk			wkly-wd	Hard						Generally consists of mafic minerals with interbeds of felsic bands. There are many cracks and hair cracks. Open cracks at adistance of 15~20m with clay films at 27.1m. Shear zone with slickensides at 28.14~28.30m.	
29–30			inter chnk			Fresh	Hard						Open cracks 30°, 70° with clay films at 28.7~28.83m. *Hair cracks 90° at 29.57~29.87m.* Planeless fault 1~3m/m wide at 29.79~30.58m.	

DRILLING CORE LOG

Hole No. TD - 5 ②

Name of Project: Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 2 of 2

Location: Talawakelle Dam 192,748.73N 187,893.87E

Depth of Bedrock: m

Bore Hole Dia: mm

Depth of Hole: 30.58 m

Elevation: 1200.600 m

Core Recovery: %

Type of Drill Machine:

Operator:

Direction:

Inclination:

Underground Water Table: m

Capacity of Pump: l/min

Supervisor:

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p - q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
30	1170.02												There are many cracks and hair cracks along the planeless fault.	
31														
32														
33														
34														
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DRILLING CORE LOG

Hole No. TD - 6

Name of Project: Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 1

Location: Talawakelle Dam 192,623.64N 187,867.66E

Depth of Bedrock: m

Bore Hole Dia: mm

Depth of Hole: 25.90 m

Elevation: 1197.542 m

Core Recovery: %

Type of Drill Machine:

Operator:

Direction:

Inclination:

Underground Water Table: m

Capacity of Pump: l/min

Supervisor:

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: p (kg/cm) / p – q curve / q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1			Soil		red-brn to yel-brn								Gravelly sand, comprising 2~7m/m gravels.	
2	1195.00													
3			inter chnk		yel-brn to wht-brn	wd							Generally altered, but core samples are undulated, partially highly weathered, cores are fragmental and short columnar shape. Inclined~vertical open joints 50°, 60°, 80°~90°, with clay film at intervals of 5~10cm. ; Weathered~highly weathered acidic charnockite at 6.20~8.94m, consists of quartz, plagioclase.	
4														
5														
6														
7			Acid-chnk		brn-wht to yel-wht	hily-wd wd								
8														
9	1188.48													
10					yel-brn	hily-wd							Washed core, comprising quartz, weathered mica grains.	
11														
12														
13	1184.36													
14						hily-wd							Non-core	
15														
16														
17	1180.78													
18					yel-brn to wht-brn	wd wkly-wd							Generally, oxidized and discolored, thin interbeds of basic charnockite and granitic gneiss. Core samples are fragmental~short clumnar shape because of many joints 30°, 45°, 60°, 70° at intervals of 3~15cm. Crack planes are oxidized and chloriticized.	
19			inter chnk											
20														
21	1176.69					wd								
22	1175.62												Inclined joint 60° at 20.85m, oxidized Inclined joint 60° at 20.96m with iron stains Inclined joint 60° at 21.92m.	
23	1174.32		mela chnk			Fresh							Less cracks at this depth. Felsic mineral band 2~7m/m wide. Vertical joint 80° with clay film at 22.86~23.34m.	
24			inter chnk										Interbeds of felsic band from 23.60~23.75m Vertical joints 80°~90° and inclined joint 40° with clay film at 23.42~23.77m. Vertical hair crack and inclined open joint 20, chlocriticized at 23.46~23.34m. Horizontal chloriticized joint 10° at 24.79~24.92m. Vertical foliation joints 80°~90° at internals of 7~15m/m at 24.97~25.25m. Inclined joint 20°, chloriticized at 25.25~25.32m. Subvertical joint 70° at 25.36~25.60m. Subvertical foliation joints at internals of 5~10m/m at 25.68~25.85m.	
25														
26	1171.63													
27														
28														
29														
30														

DRILLING CORE LOG

Hole No. TP - 2 (i)

Name of Project Feasibility Study for Upper Kotmale Hydroelectric Power Development Project

Sheet No. 1 of 12

Location Talawakelle Power Station 204,320.21N 187,505.46E

Depth of Bedrock m

Bore Hole Dia mm

Depth of Hole 351.57 m

Elevation 941.695 m

Core Recovery %

Type of Drill Machine

Operator

Direction

Inclination

Underground Water Table m

Capacity of Pump l/min

Supervisor

Depth (m)	(Thickness) Elevation (m)	Geological Symbol	Geology	Rock Quality Classifications	Core Characteristics: Color	Weathering	Hardness	Rock Quality Designation (20 40 60 80%)	Permeability Test: P (kg/cm) p-q curve q (l/m·min)	Lugeon Value	Drilling Status: Infiltrate Water Vol. / Loss Water Vol. (l/min)	Bit Type	Description	Date Drilled
1	940.98		Soil											
2					yel-brn	hily-wd							Washed core, decomposed rock, including quartz grains and biotite grains.	
3														
4														
5														
6														
7														
8	933.58													
9	932.82		inter chnk										Garnet included below 8.34m. Discolored and iron stains at 8.27~8.34m.	
10	931.06		fels gn										Fragmental~short columnar shape at 9.66~10.64m. Sub vertical joints in some section, oxidized, discolored and weathered.	
11	930.21		inter chnk										Horizontal foliation joints, chloriticized and coated with iron stains.	
12	929.32		fels gn										Interbed of intermediate charnockite in some sections. Vertical joint withiron stain at 11.49~12.26m.	
13						wkly-wd							Generally variation of rock facies is very prominent, main components are quartz, feldspar, biotite and garnets. 16.78~16.83m, Micaceous band at 14.18~14.20m. Vertical chloriticized joint at 11.92~13.38m. Horizontal and vertical joint with iron stains and chloriticized at 13.0m. Vertical joints 80° at 14.21~14.50m, chloriticized and with iron stains. Inclined foliation joint 20°~30°, chloriticized and with iron stains. Inclined joints 30°~60° at an interval of 3cm, chloriticized at 16.67~16.88m. Micaceous band at 17.23~17.40m. Foliation joints, partially fragmental, chloriticized at 17.30m. Vertical joints 80°~90°, chloriticized at 17.45~17.83m. vertical joints 80°~90° at 17.83~18.71m, chloriticized, oxidized and discolored. Inclined chloriticized joint 60° at 20.12m. Vertical joints, chloriticized at 22.0~22.86m. Vertical joints 70°~80° at 23.21~23.71m, chloriticized. Vertical joint, chloriticized at 24.71~25.07m.	
14														
15														
16														
17														
18														
19			inter chnk											
20														
21														
22														
23														
24														
25	916.89													
	916.23		bio-gn			wkly-wd							Inclined joint 40° at 24.57m, slightly altered.	
26			inter chnk										Inclined and vertical joints 60°~90° at 25.69~26.10m, slightly altered and with iron stains.	
	915.09													
27													Interbeds of biotite gneiss, intermediate charnockite in some portions Includes large garnet grains below 27.86m. Vertical joint 80° at intervals of 1~5m/m at 26.97~29.27m. Vertical joint 70° at 27.71~27.85m, chloriticized.	
28														
29														
30														