APPENDIX 9 - IMPORTANT GEOLOGICAL SITES SCHEDULE

Site	Significance	Description	Locality	Access	Classification	Hazards	Map No.
Hicks Bay limestone/basalt contact	Well exposed unconformable sedimentary contact of early Miocene shallow water limestone on Matakaoa Volcanics.	Early Miocene breccia rests on basalt flows of Matakaoa Volcanics.AGE : Eocene, Miocene.	Hicks Bay, shore platform at southern end of beach. Z14/783874	Via access road from main highway at Hicks Bay.	Importance = C Vulnerability = 3 Exposure type: Shore Platform	Possible development by builders.	GL1
Hikurangi Peak	A spectacular peak of indurated sandstone surrounded by low angle hill country, one of five. Others are Whanokao, Wharekia, Aorangi, and Taitai peaks. Classified as an extremely well defined landform of scientific/ educational and scenic value.		Mt. Hikurangi, inland from Ruatoria. Y15/ 549523.		Importance = B Vulnerability = 3		GL2
Hole in the Wall, Tolaga Bay	A narrow coastal cliff ridge, cut by an impressive sea arch. Very distinct and unusual for this region, it is a good example of a sea arch forming by the sea cutting its way through a narrow passage. Historically significant as Cook's landing place. Classified as an extremely well defined landform of scenic value.		South Tolaga Bay - 1 km East of the Wharf. Z17/ 757999		Importance = C Vulnerability = 3		GL3
Kirk's Clearing Upper Cretaceous breccia.	Channelised debris flow associated with a Late Cretaceous growing fold. Type section of Kirk's Breccia Member, Whangai Formation.	Well exposed sedimentary breccia (debris flow deposit) up to 200m thick, overlain by typical Whangai Formation. AGE: Cretaceous.	Kirk's Clearing, north-east of Motu. X16/ 206255	Walk from Motu Falls Road, through Waitangirua Station	Importance = C Vulnerability = 3 Exposure type: Track cutting, stream and river banks.	Vegetation growth, land clearance logging.	GL4

Site	Significance	Description	Locality	Access	Classification	Hazards	Map No.
Koranga Ridge Cretaceous fossil locality.	Holostratotype of Karangan Stage in New Zealand.	AGE: Cretaceous	Southwest of Matawai. X17/ 966951. Fossil record No: X17/f1007		Importance = B Vulnerability = 3 Exposure type: Hillside and road cuts.		GL5
Koranga River, early Cretaceous sediments.	Important section for early Cretaceous sequence. Type section locality of Te Wera sandstone.	Moderately indurated, well bedded conglomerate, breccia, grit, coarse to fine sandstone, interbedded siltstone unconformable on Torlesse and Koranga Sandstone. AGE: Cretaceous.	90m upstream from waterfall, Koranga River, Raukumara Range. X17/ 912967	Walk upstream from waterfall.	Importance = B Vulnerability = 3 Exposure type: Stream bank.		GL6
Lottin Point melange	Good example of melange.	Melange in obducted Matakaoa Ophiolite. AGE: Cenozoic.	Lottin Point, East Cape. Y14/ 660926	State Highway 35 to Potaka then Lottin Point Road to shoreline.	Importance = C Vulnerability = 3 Exposure type: Coastal cliffs and shore platforms.		GL7
Mangaotane Stream cretaceous section, north Gisborne.	Type section of Raukumara series, important reference section for the Cretaceous sedimentary sequences of the North Island, presence of red and green "valcogenic" beds. Holostratotype of Raukumara Series stages in New Zealand.	Mudstone sequence. AGE: Cretaceous	Mangaotane Stream, approximately 9 km upstream from Motu River. X16/ 286308. Fossil record No: X16/f7502.	Via Mangaotane Station, Tarndale Road.	Importance = B Vulnerability = 3 Exposure type: River and stream cuts.		GL8
Mangapoi Stream volcanics.	Well exposed sequence of Rip volcanics.	In situ dolerite, basalt, local pillow lavas and sodic keratophyric tuff. AGE: Cretaceous.	Outcrops in Mangapoi Stream, 2.5 km up stream from junction of Tupuaeroa River. Y15/602618		Importance = C Vulnerability = 3		GL9

Site	Significance	Description	Locality	Access	Classification	Hazards	Map No.
Mangapoike cuestas	One of few examples of cuestas in the North Island. The are at least three distinct cuestas. Classified as a moderately well defined landform of scientific/ educational and scenic value. AGE: Kaikoura Orogeny.		Confined to an area between State Highway 35 and 10 km to the east, in northern Hawkes Bay. X18/ 150505	Best seen from air.	Importance = B Vulnerability = 3		GL10
Mangatu River earth flow	A fast moving, large and well documented earthflow. Classified as an extremely well defined landform of scientific/ educational value.		Mangatahu, west bank of Mangatu River, eastern Raukumaras. X16/ 282126		Importance = C Vulnerability = 2	Potentially vulnerable to reforestation.	GL11
Mata Link Road earth flow	very large extremely active earthflow on easy slopes. One of the best and most accessible in East Cape. Classified as an extremely well defined landform of scientific/ educational and scenic value.	Age: Post deforestation	2 km along Mata Link Road. Y16/ 522358		Importance = C Vulnerability = 3	Reforestation	GL12
Mata River clastic sequence	Excellent exposure of cretaceous clastic sequence.	Over 1 km of steeply dipping, cm-m bedded, fossiliferous, alternating carbonaceous sandstone and mudstone, generally greater than 1:1, minor conglomerate, glauconitic lenses red and green mudstone, pebbly mudstone, pyrite nodules, sideritic and cone-in-cone concretions. Wide range of sedimentary structures. Three distinctive olistostrome-slump zones. AGE: Cretaceous.	Mata River, approximately 1.5 km west of Waingakia Homestead. Y15/ 637467	Along Horehore Road (private), off Makarika Road, off SH 35.	Importance = B Vulnerability = 3 Exposure type: river bank		GL13

Site	Significance	Description	Locality	Access	Classification	Hazards	Map No.
Matakaoa Point marine terraces and shore platform	A sequence of at least three well preserved marine terraces in association with an impressive shore platform. Maximum recorded uplifted height for the late quaternary Otamaroa Terrace is 300m with marked NW tilting of the terrace. Classified as an extremely well defined landform of scientific/ educational value.		Matakaoa Point, north coast of Hicks bay. Z14/795908	SH 35	Importance = C Vulnerability = 3 Exposure type: Deforested natural		GL14
Motu Falls Cretaceous section, Raukumara Range	Excellent exposure of part of the Clarence Series stratotype; sell beds present. Holostratotype of Clarence Series stages in New Zealand.	Interbedded mudstone and sandstone. AGE: Cretaceous	About 100m upstream and downstream of Motu Falls. 12 to 13 km north-east of Matawai. X16/123179. Fossil Record No: X16/f7581	From Motu Road.	Importance = B Vulnerability = 3 Exposure type: Stream bed and banks.	Erosion, slumping of banks	GL15
Muddy Creek Miocene section, Poverty Bay	Parastratotype of Lillburnian and Waiauan stages in New Zealand	AGE: Miocene	South branch of Middy Creek, ca. 6 km of stream section. Y16/410210. Fossil record No: Y16/f7550		Importance = B Vulnerability = 3 Exposure type: Stream cuttings		GL16
Ormond Pleistocene plant beds	Type locality of several species, very well-preserved material.	Carbonised remains in volcanic silt. AGE: Escarpment	In 1 km long escarpment, Ormond, Poverty Bay district. Y16/399827. Fossil record No: Y17/f9503		Importance = B Vulnerability = 3 Exposure type: Escarpment		GL17
Oweka Creek Pliocene macrofauna, Cape Runaway	The only Opoitian macrofauna in this region.	AGE: Pliocene	First outcrop on left of Waikura Road, 100m up road from junction with SH 35. Y14/647878. Fossil record No: Y14/f7804		Importance = C Vulnerability = 3 Exposure type: Road side outcrop		GL18

Site	Significance	Description	Locality	Access	Classification	Hazards	Map No.
Pakare River uplifted and faulted Holocene marine benches	A sequence of seven Holocene terraces formed by episodic uplift related to earthquake activity. Important due to the completeness of the sequence - one of the most complete in the country. N-S trending active fault scarp is upthrown to NW and fault scarp height reduces towards the coast. Classified as a moderately well defined landform of scientific/educational value.	AGE: Holocene; 600-6,500 BP	About 28 km north of Gisborne at the mouth of the Pakarae River, west bank area. Y17/671816	Access approximately 2 km north from Whangara along the beach.	Importance = B Vulnerability = 3 Exposure type: Botanically altered natural	Coastal erosion, farming practices.	GL19
Pourewa Island Blowhole	A very large blowhole cut through sandstone. Classified as an extremely well defined landform of scientific/educational and scenic value.	Post Glacial - probably linked to 6000 BP post glacial high.	Pourewa Island on the southern end of Tologa Bay, 4 km east of Tologa bay township. Z17/768992		Importance = C Vulnerability = 3	Coastal erosion	GL20
Raukumara uplifted "peneplain"	a high flat surface forms the crest of the Raukumara Range. Classified as a n extremely well defined landform of scientific/educational and scenic value.		The crest of the Raukumara Range, in the headwaters of the Mangatane River. Y16/310350		Importance = C Vulnerability = 3		GL21
Tapuaeroa River backtilted terraces	Rapid (<1500 years) backtilting of river terraces due to Hikurangi margin subduction or growth of bentonitic diapirs. Has been linked with major marine terrace height discontinuity near East Cape and suggests major active thrust.		True left bank of Tupuaeroa River, above junction of Mata and Tupuaeroa River. Z15/734558		Importance = C Vulnerability = 3	Farming practices	GL22

Site	Significance	Description	Locality	Access	Classification	Hazards	Map No.
Tapuaeroa Valley klippe	A good example of structural klippe.	A klippe of Cretaceous, accreted rock, covering a large area of Tapuaeroa River. AGE: Cretaceous, Cenozoic	Tapuaeroa, East Cape. Y15/665544	Via Tapuaeroa Road off SH 35 (just north of Ruatoria).	Importance = B Vulnerability = 2 Exposure type: Mountain topography	Afforestation	GL23
Tarndale and Mangatu slips	Very active gullied earth flows surrounded by exotic forest - some of the most highly active in the North Island. Classified as extremely well defined landforms of scientific/educational and scenic value.	AGE: Probably since deforestation	Each side of Tarndale Road, 1 km north of Te Iwiroa Trig, Mangatu State Forest. X16/293178	Road runs between Mangatu and Tarndale slips.	Importance = B Vulnerability = 3		GL24
Tatapouri shore platform	A very wide planar shore platform formed due to rapid coastal erosion and retreat of the sea cliffs. Classified as an extremely well defined landform of scientific/educational and scenic value.	AGE: Miocene, Pliocene	Tatapouri Point, 10 km east of Gisborne. Y18/578703		Importance = C Vulnerability = 3	Lower edge is vulnerable to road building.	GL25
Tauwhareparae plateau	An extensive low relief surface or tableland in contrast to deeply dissected eroding surrounding country. Classified as an extremely well defined landform of scientific/educational and scenic value.	AGE: Dates back to last glaciation.	Either side of the Tauwhareparae Road, between Taurau Station and Fernside Station, but particularly well developed around Tauwhareparae. Y16/565123		Importance = B Vulnerability = 3		GL26

Site	Significance	Description	Locality	Access	Classification	Hazards	Map No.
Te Araroa Upper Miocene section	One of the best exposed and most easily accessed sequences of upper Miocene sedimentary rocks in East Coast region. Continuous sequence with diverse warm water fauna and rich trace fossil assemblage.	Prograding lower shelf sediments over upper slope material. Lower unit (Pohutu formation) is a very calcareous sandy siltstone, upper unit (Paeoneone Formation) is a fossiliferous silty sandstone. Contact between the two is gradual. AGE: Miocene, Pliocene	Exposed along 12 km of intertidal and cliff exposures, between mouth of Awatere River and Wharepapa. Z14/846824. Fossil record No: Z14/f9524	Roadside	Importance = B Vulnerability = 3 Exposure type: Coastal cliffs, platform and road cuts.		GL27
Te Araroa beach ridges	A series of abandoned beach ridges stretching back approximately 2.5 km from present sea level. Best example in East Cape. Classified as an extremely well defined landform of scientific/educational and scenic value		Te Araroa Beach, either side of the Karakatuwhero River mouth, 16 km west of east Cape. Z14/825830		Importance = C Vulnerability = 3		GL28
Te Kiwikiwi pillow lava	Best evidence for Eocene volcanism in East Cape.	Aphyric and porphyritic spilitic basaltic pillow lavas interbedded with Eocene sediments. AGE: Eocene	Exposed on Te Kiwikiwi Hill. Z14/806756		Importance = C Vulnerability = 3		GL29
Te Puia Hot Springs		Hot springs with associated sinter deposits and gas and water seepages. Fluid type: Neutral-chloride and highly mineralised.	Te Puia Springs on the East Cape. Z16/748359		Importance = C Vulnerability = 2		GL30

Site	Significance	Description	Locality	Access	Classification	Hazards	Map No.
Te Puia Springs earthflow and mud volcanoes	A very large deep seated earthflow affecting most of Te Puia Springs township. Associated with thermal springs and volcanoes. Classified as moderately well defined landforms of scientific/educational and scenic value.		Te Puia Springs. Z16/760360		Importance = C Vulnerability = 3		GL31
Te Rata Stream, Cretaceous sediments	Reference section of Whangai Formation	Noncalcareous to calcerous siliceous mudstone. AGE: Cretaceous	Te Rata Stream. X16/300284	Walk from Tarndale Road (Te Rata or Mangaotane Stations).	Importance = B Vulnerability = 3	Landslides, river aggradation	GL32
Tikihore Stream breccia	Best known example of East Coast Volcanics, Raukumara Peninsula.	10m of dark-grey volcanic breccia interbedded with alternating sandstone and mudstone. Clasts are basalt. AGE: Cretaceous	Tikihore stream. Y16/340232		Importance = C Vulnerability = 2	Forestry develop- ment, slumping	GL33
Tutamoe Plateau	An excellent example of a synclinal remnant of resistant sandstone forming a plateau. Classified as an extremely well defined landform of scientific/educational and scenic value.	AGE: Quaternary	Headwaters of the Waipaoa, Mata and Waingaromia Rivers. Y16/435185		Importance= C Vulnerability = 3		GL34
Waiapu River delta	Rapidly accreting river mouth with barrier forming. Classified as an extremely well defined landform of scientific/educational value.		Mouth of Waiapu River, on the coast 7 km from Tikitiki. Z15/930660	Best seen from air.	Importance = C Vulnerability = 3		GL35

Site	Significance	Description	Locality	Access	Classification	Hazards	Map No.
Waimata mud volcanoes	Saline mud and gas seep and bubble out of a number of low conical mounds of mud. One of the best and most accessible East Coast examples. Classified as an extremely well defined landform of scientific/educational and scenic value.	AGE: Latest Quaternary	Over a half kilometre area of farmland on the Kaharoa Station, north of Gisborne on the Waimata-Hokoroa Road. Y17/508893	2 minutes walk from the road.	Importance = B Vulnerability = 2		GL36
Waiorongomai Gully	Extremely large scale and deep seated gullying in argillite, extremely active. A spectacular example, one of the best in New Zealand. Classified as an extremely well defined landform of scientific/educational and scenic value.	AGE: Probably post-deforestation	3 km up Waiorongomai River, off Tapuaeroa River. Y15/696603		Importance = B Vulnerability = 3		GL37
Waipaoa River braid channel	A rapidly aggrading river channel with material infilling the valley 20-30 m deep. Important because of extremely high aggradation rate of about 30mm/year. Classified as an extremely well defined landform of scientific/educational value.	AGE: Approximately 120 years	Stream bed opposite Mangatu Forest Headquarters. Y16/348138		Importance = B Vulnerability = 3		GL38
Waitangi oil shaft	One of the best preserved and earliest hand dug shafts in New Zealand.	Hand dug to 100 ft. depth in 1874, bored a further 110ft. Concrete foundation preserved.	Waitangi station, 8 km from Whatatutu. Y17/386062	private 4WD farm track	Importance = B Vulnerability = 3	Infilling	GL39