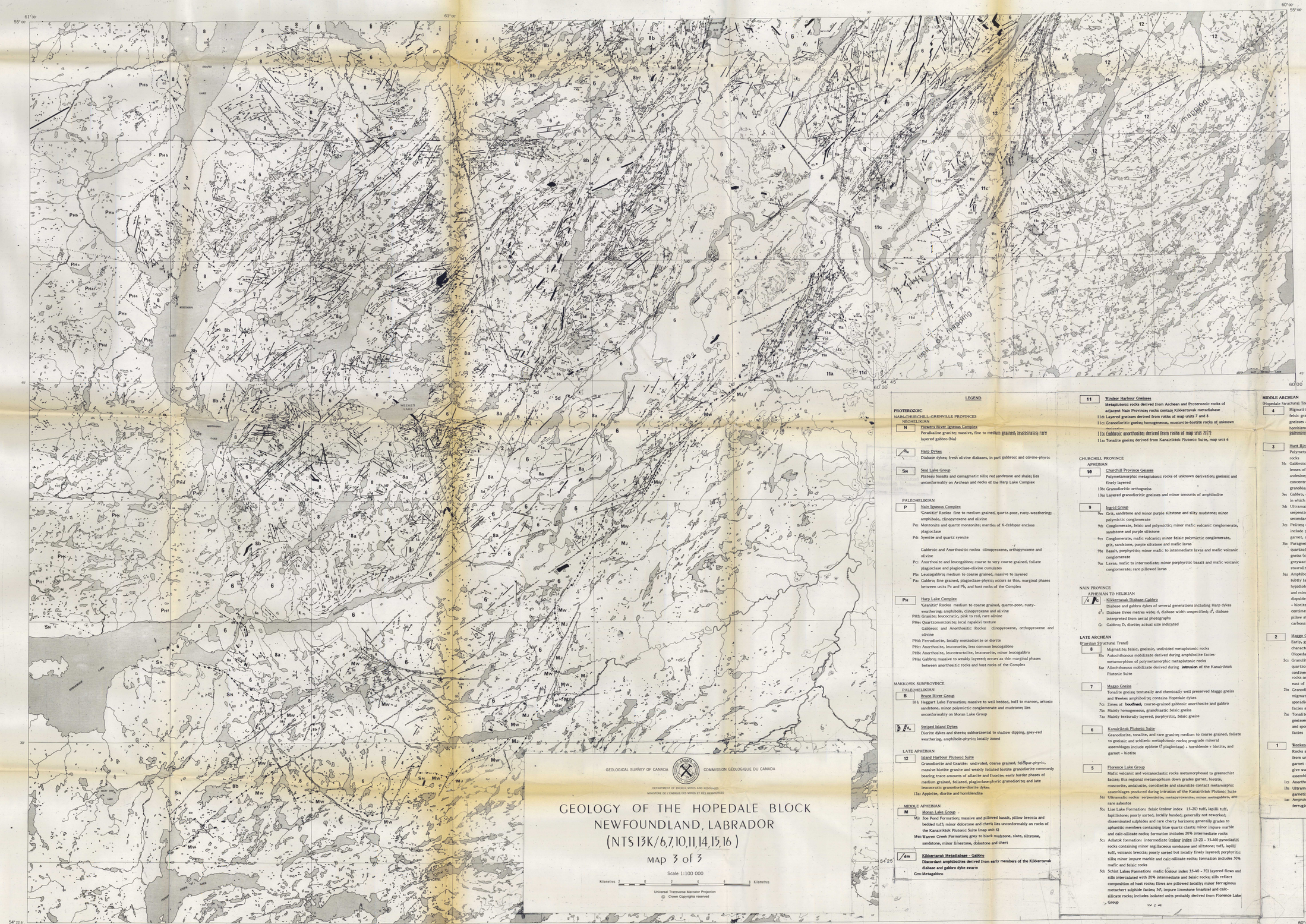

GEOLOGICAL SURVEY OF CANADA — COMMISSION GÉOLOGIQUE DU CANADA

DEPARTMENT OF ENERGY, MINES AND RESOURCES
MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES

GEOLOGY OF THE HOPEDALE BLOCK NEWFOUNDLAND, LABRADOR (NTS 13K/6,7,10,11,14,15,16)

MAP 3 of 3

Scale 1:100 000

Kilometres 2 0 2 4 6 8 Kilometres

Universal Transverse Mercator Projection

LEGEND

PROTEROZOIC

NAIN-CHURCHILL-GRENVILLE PROVINCES

NEOHELIKIAN

N Flowers River Igneous Complex
Peralkaline granite; massive, fine to medium grained, leucocratic; rare layered gabbro (Nu)

Hu Harp Dykes
Diabase dykes; fresh olivine diabases, in part gabbroic and olivine-phyric

Sn Seal Lake Group
Plateau basalts and comagmatic sills; red sandstone and shale; lies unconformably on Archean and rocks of the Harp Lake Complex

PALEOHELIKIAN

P Nain Igneous Complex
'Granitic' Rocks: fine to medium grained, quartz-poor, rusty-weathering; amphibole, clinopyroxene and olivine
Pm Monzonite and quartz monzonite; mantles of K-feldspar enclose plagioclase
Ps Syenite and quartz syenite

Gabbroic and Anorthositic rocks: clinopyroxene, orthopyroxene and olivine
Pc Anorthosite and leucogabbro; coarse to very coarse grained, foliate plagioclase and plagioclase-olivine cumulates
Pb Leucogabbro; medium to coarse grained, massive to layered
Pa Gabbro; fine grained, plagioclase-phyric; occurs as thin, marginal phases between units Pc and Pb, and host rocks of the Complex

PH Harp Lake Complex
'Granitic' Rocks: medium to coarse grained, quartz-poor, rusty-weathering; amphibole, clinopyroxene and olivine
PHf Granite; leucocratic, pink to red, rare olivine
PHm Quartzmonzonite; local rapakivi texture
Gabbroic and Anorthositic Rocks: clinopyroxene, orthopyroxene and olivine
PHd Ferrodiorite, locally monzodiorite or diorite
PHc Anorthosite, leuconorite, less common leucogabbro
PHb Anorthosite, leucotroctolite, leuconorite, minor leucogabbro
PHa Gabbro; massive to weakly layered; occurs as thin marginal phases between anorthositic rocks and host rocks of the Complex

MAKKOVIK SUBPROVINCE

PALEOHELIKIAN

B Bruce River Group
Bu Heggart Lake Formation; massive to well bedded, buff to maroon, arkosic sandstone, minor polymictic conglomerate and mudstone; lies unconformably on Moran Lake Group

Striped Island Dykes
Diorite dykes and sheets; subhorizontal to shallow dipping, grey-red weathering, amphibole-phyric; locally zoned

LATE APHEBIAN

12 Island Harbour Plutonic Suite
Granodiorite and Granite: undivided, coarse grained, feldspar-phyric, massive biotite granite and weakly foliated biotite granodiorite commonly bearing trace amounts of allanite and fluorite; early border phases of medium grained, foliated, plagioclase-phyric granodiorites; and late leucocratic granodiorite-diorite dykes
12a Appinite, diorite and hornblendite

MIDDLE APHEBIAN

M Moran Lake Group
Mj: Joe Pond Formation; massive and pillowed basalt, pillow breccia and bedded tuff; minor dolostone and cherty lies unconformably on rocks of the Kanairiktok Plutonic Suite (map unit 6)
Mw: Warren Creek Formation; grey to black mudstone, slate, siltstone, sandstone, minor limestone, dolostone and chert

dm Kikkertavak Metadiabase - Gabbro
Discordant amphibolites derived from early members of the Kikkertavak diabase and gabbro dyke swarm
Gm: Metagabbro

11 Windsor Harbour Gneisses
Metaplutonic rocks derived from Archean and Proterozoic rocks of adjacent Nain Province; rocks contain Kikkertavak metadiabase
11b Layered gneisses derived from rocks of map units 7 and 8
11c Granodioritic gneiss; homogeneous, muscovite-biotite rocks of unknown derivation
11b Gabbroic anorthosite(s) derived from rocks of map unit 3(?)
11a: Tonalite gneiss; derived from Kanairiktok Plutonic Suite, map unit 6

CHURCHILL PROVINCE

APHEBIAN

10 Churchill Province Gneisses
Polymetamorphic metaplutonic rocks of unknown derivation; gneissic and finely layered
10b Granodioritic orthogneiss
10a: Layered granodioritic gneisses and minor amounts of amphibolite

9 Ingrid Group
9m: Grit, sandstone and minor purple siltstone and silty mudstone; minor polymictic conglomerate
9d: Conglomerate, felsic and polymictic; minor mafic volcanic conglomerate, sandstone and purple siltstone
9c: Conglomerate, mafic volcanic; minor felsic polymictic conglomerate, grit, sandstone, purple siltstone and mafic lavas
9b: Basalt, porphyritic; minor mafic to intermediate lavas and mafic volcanic conglomerate
9a: Lavas, mafic to intermediate; minor porphyritic basalt and mafic volcanic conglomerate; rare pillowed lavas

NAIN PROVINCE

APHEBIAN TO HELIKIAN

d / d^1 / d^2 Kikkertavak Diabase-Gabbro
Diabase and gabbro dykes of several generations including Harp dykes
d^1: Diabase three metres wide; d, diabase with unspecified; d^2, diabase interpreted from aerial photographs
Gt Gabbro D, diorite; actual size indicated

LATE ARCHEAN

(Fiordian Structural Trend)

8 Magmatites; felsic, gneissic, undivided metaplutonic rocks
8m Autochthonous mobilizate derived during amphibolite facies metamorphism of polymetamorphic metaplutonic rocks
8a: Allochthonous mobilizate derived during **intrusion** of the Kanairiktok Plutonic Suite

7 Maggo Gneiss
Tonalite gneiss; texturally and chemically well preserved Maggo gneiss and Weekes amphibolite; contains Hopedale dykes
7c Zones of **boudinaged**, coarse-grained gabbroic anorthosite and gabbro
7b: Mainly homogeneous, granoblastic felsic gneiss
7a: Mainly texturally layered, porphyritic, felsic gneiss

6 Kanairiktok Plutonic Suite
Granodiorite, tonalite, and rare granite; medium to coarse grained, foliate to gneissic and schlieric metaplutonic rocks; prograde mineral assemblages include epidote (? plagioclase) + hornblende + biotite, and garnet + biotite

5 Florence Lake Group
Mafic volcanic and volcaniclastic rocks metamorphosed to greenschist facies; this regional metamorphism down grades garnet, biotite, muscovite, andalusite, cordierite and staurolite contact metamorphic assemblages produced during intrusion of the Kanairiktok Plutonic Suite
5a: Ultramafic rocks: serpentinite, metapyroxenite, minor metagabbro; **NO** rare asbestos
5b: Lise Lake Formation: felsic (colour index 15-20) tuff, lapilli tuff, lapillistone; poorly sorted, locally banded; generally not reworked; disseminated sulphides and rare cherty horizons; generally grades to aphanitic members containing blue quartz clasts; minor impure marble and calc-silicate rocks; formation includes 20% intermediate rocks
5c: Adlatok formation: intermediate (colour index 13-20 - 35-40) pyroclastic rocks containing minor argillaceous sandstone and siltstone; tuff, lapilli tuff, volcanic breccia; poorly sorted but locally finely layered; porphyritic sills; minor impure marble and calc-silicate rocks; formation includes 30% mafic and felsic rocks
5d Schist Lakes Formation: mafic (colour index 35-40 - 70) layered flows and sills intercalated with 20% intermediate and felsic rocks; sills reflect composition of host rocks; flows are pillowed locally; minor ferruginous metachert sulphide facies; Mf, impure limestone (marble) and calc-silicate rocks; includes isolated units probably derived from Florence Lake Group

MIDDLE ARCHEAN

(Hopedale Structural Trend)

4 Migmatites; veined and anatectically reconstituted, irregularly layered, felsic granodioritic gneisses produced during shear deformation of Maggo gneisses and Weekes amphibolites; alkali-rich neosomes containing biotite, hornblende and garnet grade to zoned quartzofeldspathic and mafic paleosomes containing amphiboles, garnet, pyroxene and sodasine

3 Hunt River Group
Polymetamorphic, polydeformational metasediments and metaigneous rocks
3t Gabbroic anorthosite and anorthositic gabbro; layered gneisses comprising lenses of amphibole in a granoblastic matrix of zoned labradorite-andesine; locally, in areas of lesser strain, polycrystalline plagioclase concentrations of football-size and larger occur in 10 to 20% 'interstitial' granoblastic amphibole and pyroxene
3m Gabbro, diorite and quartz-monzodiorite; medium to coarse grained rocks in which colour indices average 40; gneissic layering is developed locally
3d Ultramafic rocks: talcose serpentinite, tremolite schist and hornblendites; serpentinites weather rusty brown and contain either primary or secondary olivine and orthopyroxene suggestive of peridotitic source rocks
3c Pelites; coarse grained, porphyroblastic schists; stable mineral associations include plagioclase + cordierite + biotite, plagioclase + staurolite + / - garnet, and quartz + biotite + sillimanite (?)
3b Paragneiss; variegate, granoblastic, layered (flaggy weathering), quartzofeldspathic gneiss (colour index 10 to 25); layered hornblende gneiss (colour index 20 to 40); rocks were probably derived from greywackes; stable mineral associations include biotite + garnet + staurolite, and plagioclase + epidote + amphibole
3a Amphibolites; derived from tholeiitic basalts and hornblendite sheets; subtly laminated; colour index ranges 40 to 90; nematoblastic-hypidioblastic amphiboles in a fine grained matrix of mainly plagioclase and minor quartz; members include hornblende + plagioclase + quartz, diopside + hornblende + plagioclase, and hornblende + garnet + plagioclase + biotite + quartz; the latter assemblage is restricted to laminae a few centimetres wide containing as much as 30% garnet; two occurrences of pillow structures were observed; late amphiboles, chlorite, epidote and carbonate are ubiquitous

2 Maggo Gneiss
Early, grey, leucocratic, granoblastic quartzofeldspathic gneisses characterized by granoblastic, mafic, hornblende-plagioclase dykes (Hopedale dykes)
2c Granulite facies linbated granodioritic rocks and layered quartzofeldspathic gneisses probably derived from map units 2a and 2b; confined to mainly west of longitude 61°20' of the map area where the rocks are progressively overprinted by Proterozoic greenschist facies; east of this longitude orthogneiss is metastable in amphibolite facies
2b Granodiorite-tonalite porphyroblastic gneiss; locally layered and migmatized; microcline, biotite, hornblende, quartz, plagioclase and sporadic garnet give way westward to upper amphibolite and granulite facies assemblages
2a Tonalite gneiss; homogeneous, medium grained; migmatite and hornblende gneisses occur locally; biotite, hornblende, quartz, plagioclase, epidote and sporadic garnet give way westward to upper amphibolite and granulite facies

1 Weekes Amphibolites
Rocks assumed to be derived in part from Hunt River Group and in part from unknown, possible older rocks; hornblende + clinopyroxene + garnet, garnet + biotite, and hornblende + biotite + orthopyroxene + hornblende give way to orthopyroxene + clinopyroxene garnet (? hornblende, biotite) assemblages westward in the map area
1cu Anorthositic rocks associated with ultramafics and amphibolites
1b Ultramafics; mainly serpentinites, tremolite-actinolite schists and garnetiferous amphibolites; metastable orthopyroxene and rare olivine
1ai Amphibolites; commonly associated with ultramafics and rare laminae of ferruginous or aluminous metasediments