Manitoba
Energy and Mines
Geological Services

THE TIE CREEK LAND USE CONFLICT:

A GEOLOGICAL PERSPECTIVE

by B.E. Schmidtke

Winnipeg, 1988

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SUMMARY

Energy and Mines have identified the "Tie Creek Basin", in the Whiteshell Provincial Park, as having the highest potential for dimension stone production in Manitoba.

The site has caused conflict over land use between the Manitoba Government Departments of Natural Resources, Historic Resources and Energy and Mines.

The granite outcrops in question are within the "extensive recreation zone" where mining and forestry activity are permitted, with some restrictions, according to the 1983 Whiteshell Master Plan. Historic and Natural resources object to commercial development because of a concentration of Indian boulder mosaics, known as petroforms, in an area several kilometres from the rock outcrop requested as a quarry site.

Manitoba Energy and Mines acknowledge the historical and cultural significance of the Bannock Point and the Tie Creek petroform sites, but insist that a granite quarry will not interfere with the petroforms. The proposed quarry sites are 2500 and 1500 m from any known petroforms. The restricted access that a quarry would allow will also provide protection to the fenced-in Tie Creek Petroform site.

Energy and Mines proposed that Historic Resources complete a survey for petroforms at the potential quarry site. Reasonable guidelines for access, quarrying, removal of blocks and rehabilitation will then be established by Natural Resources, Historic Resources and Energy and Mines. Test quarrying to determine if the rock is quarryable will follow. If results are favourable, a small quarry will supply rock to the international stone market. The quarry could also be used as an educational facility on resource use within the park.

Introduction

The new Investor's Building, One Canada Centre is clad in $600,000 worth of red granite from Texas (Appendix A). The texture, grainsize variations, streaks of black minerals and mineral composition of this granite is remarkably similar to the rock of the Tie Creek Basin. The Bank of Montreal Office tower (Fig. 1) is clad in grey granite from Sardinia. This is a coarse grained granite, as is the Tie Creek rock. The Royal Winnipeg Ballet building (Fig. 2) is clad with reddish-pink granite from Ontario.

In short, millions of dollars worth of dimension stone granite is being supplied to Manitoba by other provinces and countries while a potential source of granite remains untapped in Manitoba.

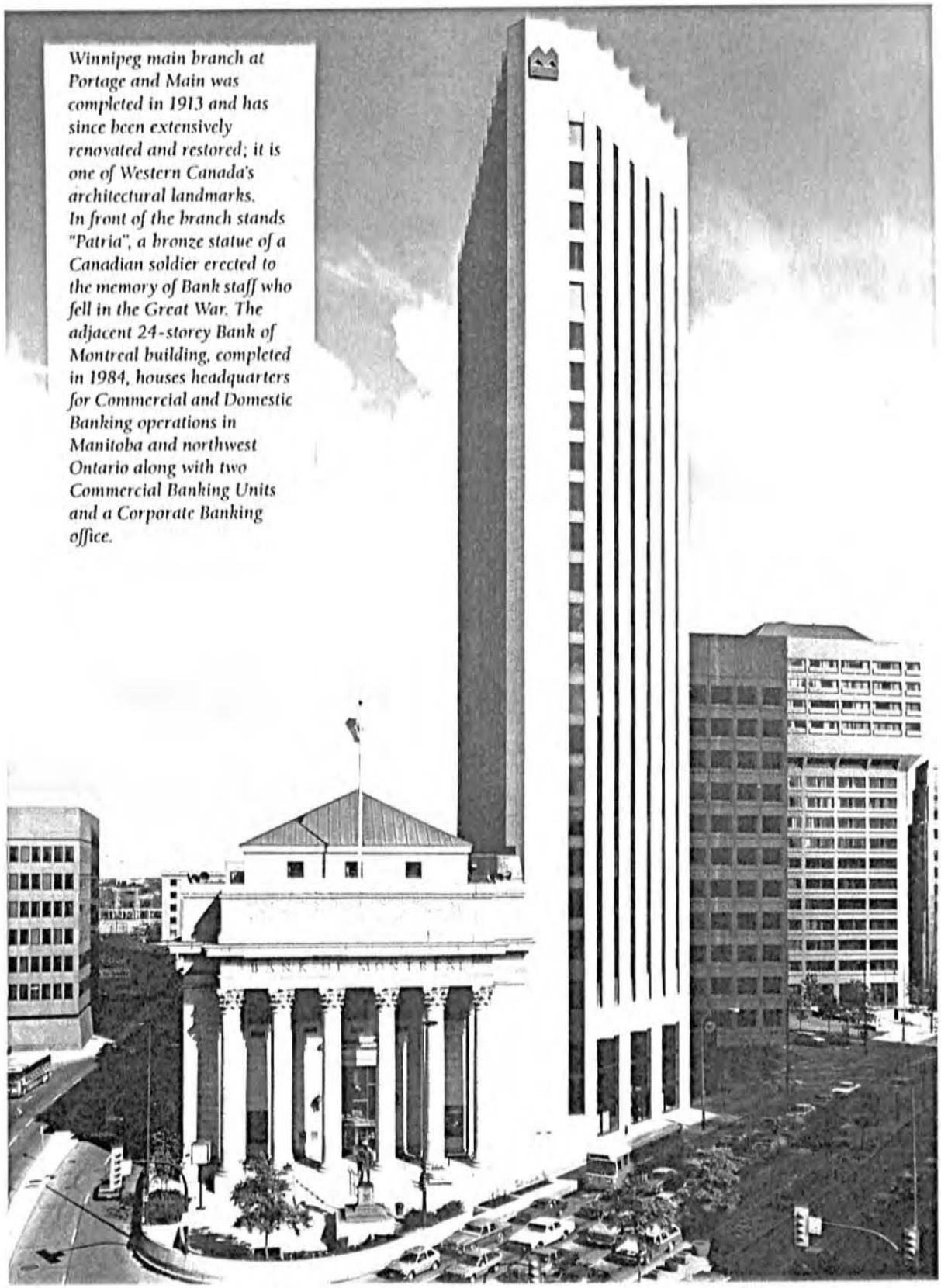


Figure 1: Bank of Montreal Office Tower, Winnipeg.

Figure 2: Red-pink granite from Vermilion Bay, Ontario on the first storey of the Royal Winnipeg Ballet Building

Characteristics of High Quality Dimension Stone

The use of granite as a decorative cladding for building exteriors and interiors has become popular in North America. Stone is in fashion with architects and the cost of mass produced, thin granite tiles is approaching that of the steel and glass that has been popular for the past 20 years.

With the increased demand for stone has come a corresponding interest in the development of granite quarries. Specific characteristics are required in a granite deposit to make it quarryable.

1. Access and transport distances to finishing facilities and markets are primary concerns. Stone is a low cost per unit volume commodity and cannot support the economics of a long haul to finishing facilities and markets. Granite quarries have a maximum market radius beyond which it is not profitable to transport the stone. The closer the markets and finishing facilities to a quarry, the more competitive and potentially successful the quarry.

2. A commercial granite must have a homogeneous and aesthetically pleasing colour and texture. Irregularities, such as black streaks, are allowed provided they are homogeneously distributed throughout the deposit. Pink, red, grey and "black" granites are sold extensively. Stone with unique colours, such as amber, green, blue or jet black, and unique textures commands higher prices than the more common colours and textures.

3. Geologically, the stone deposit must have a widely spaced fracture pattern to permit the removal of large blocks. Deleterious minerals that may rust, weather or decrease the rock strength must be virtually absent. The stone must meet minimum strength requirements according to ASTM standards.

A granite deposit such as the amber granite of the Tie Creek basin, which meets most of the above specifications, (ASTM strength testing and determination of horizontal joint spacing have not been done) is a rare and valuable resource. The characteristics of the two granites in the Betula Lake pluton are given in Table 1.

Table 1. Betula Lake Pluton

Advantages	Disadvantages
Amber granite	
- unique colour	
- attractive and fashionably coarse grained texture	- access road needs upgrading
- large (2.5 x 1.5 km) unjointed outcrop	
- 5 to 7 km distant from Nutimik and Betula cottage sites	
Red granite	
- deep red colour	
- coarse grained texture	
- accessed by fair-weather roads	- contains altered sphene that plucks on polishing
- 5 km from cottages	- some deep micro-fractures
- benched, easily quarried outcrop formation	

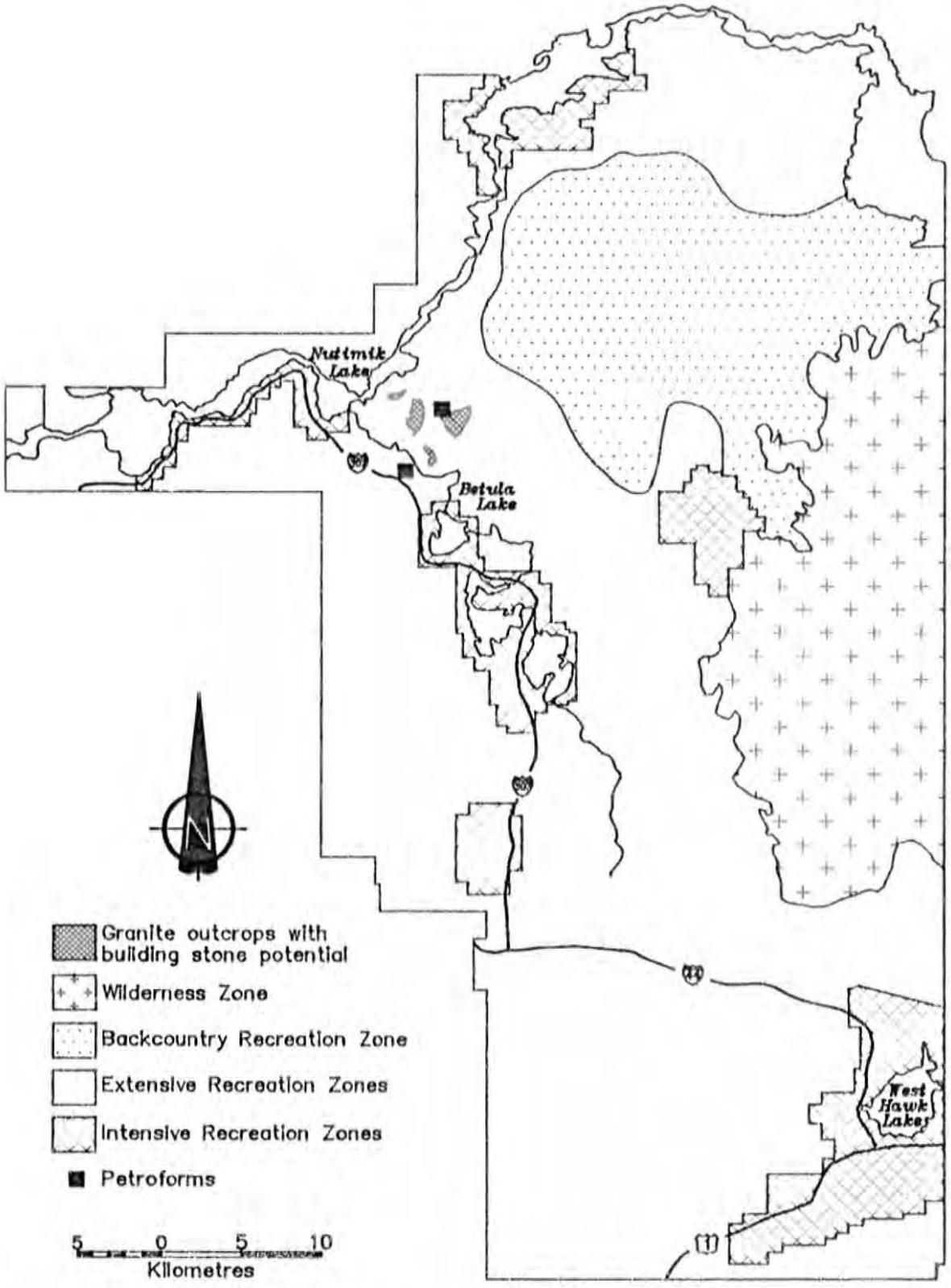
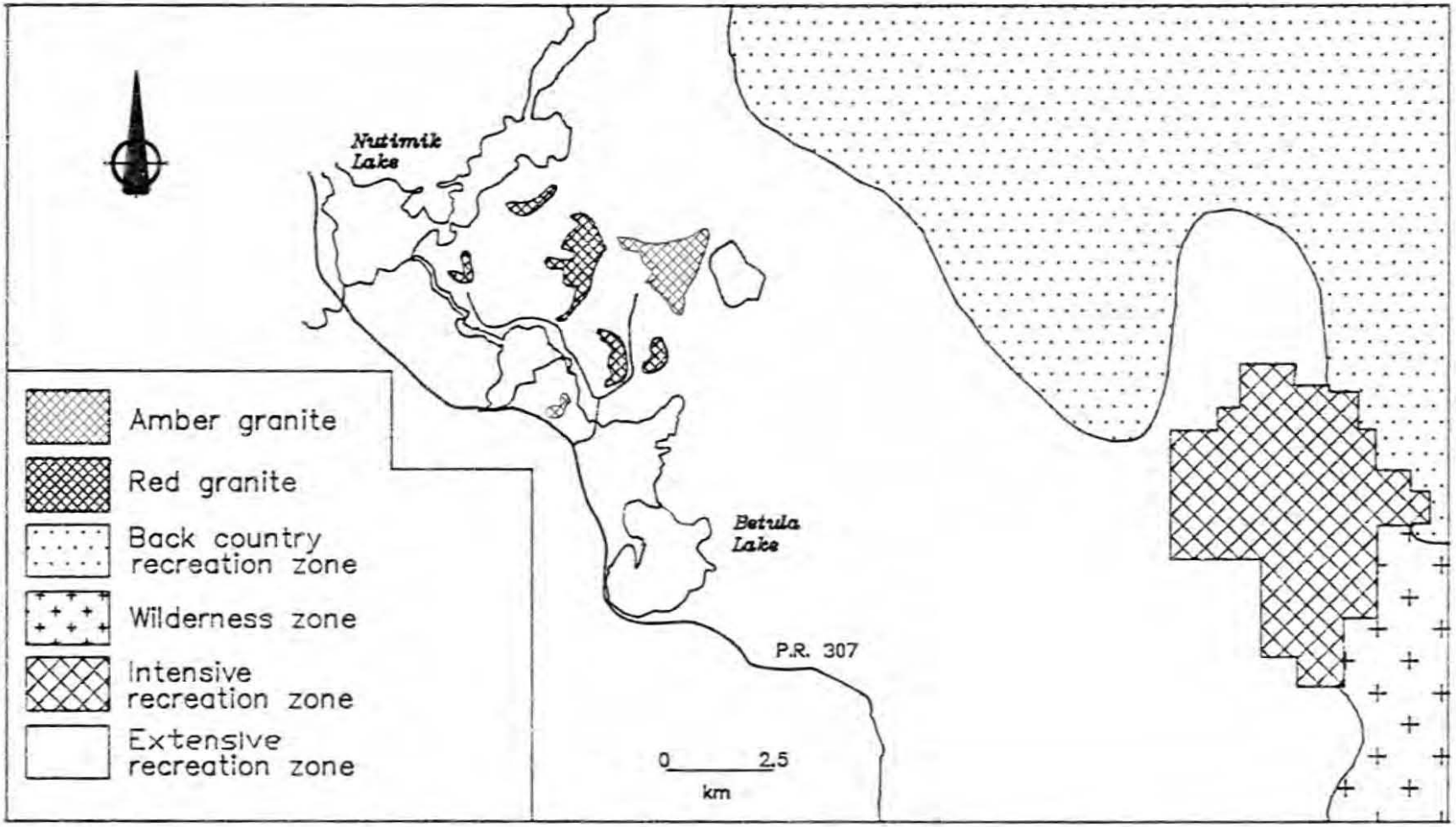


Figure 3: Designated Land Use Zones (from Whiteshell Master Plan, 1983). Note that the granite outcrops with building stone potential are located in the extensive recreation zone.

Fig. 4 Outcrops with potential as dimension stone producers.



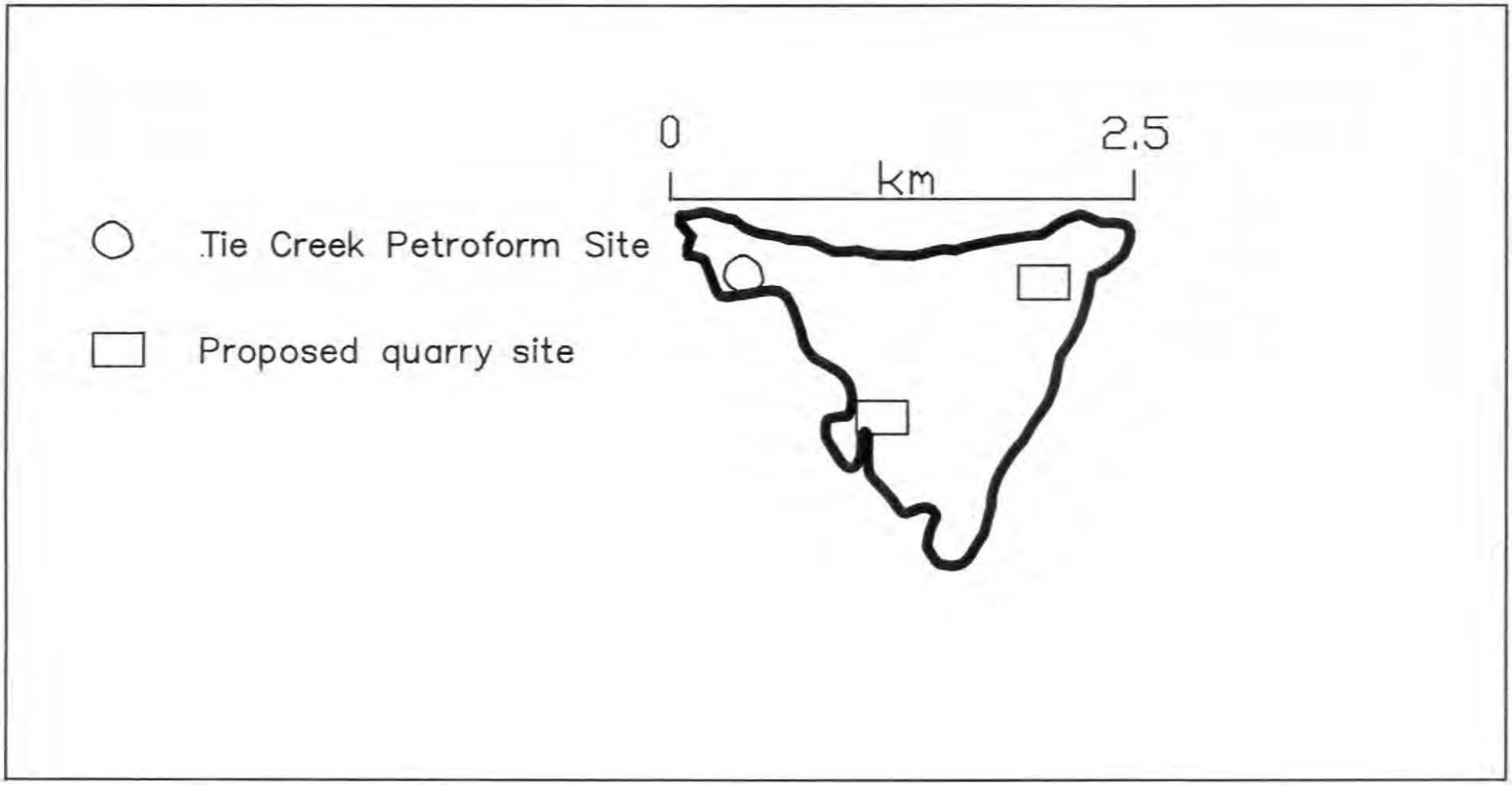


Figure 5: Petroform and proposed quarry sites on the amber granite within the Tie Creek Basin.

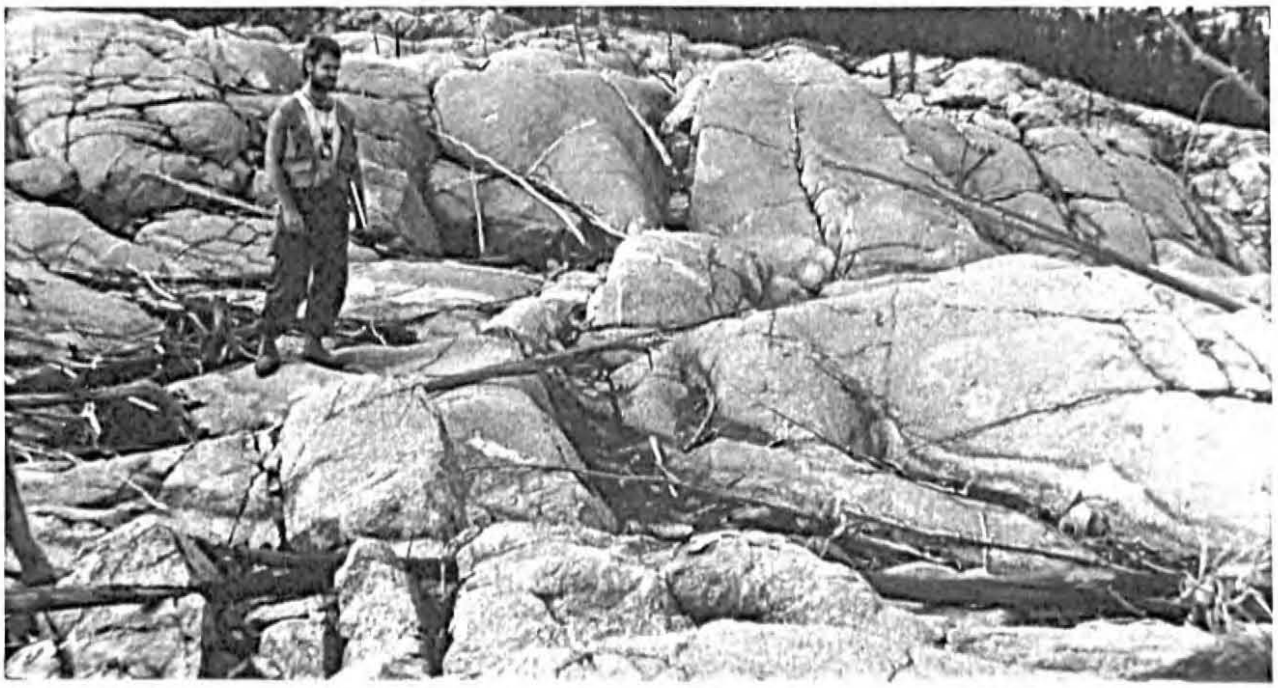


Figure 6: Typical granite outcrop of the Precambrian Shield. Note the closely spaced fractures.

Figure 7: Outcrop of amber granite in the "Tie Creek Basin". Note the absence of joints and fractures.

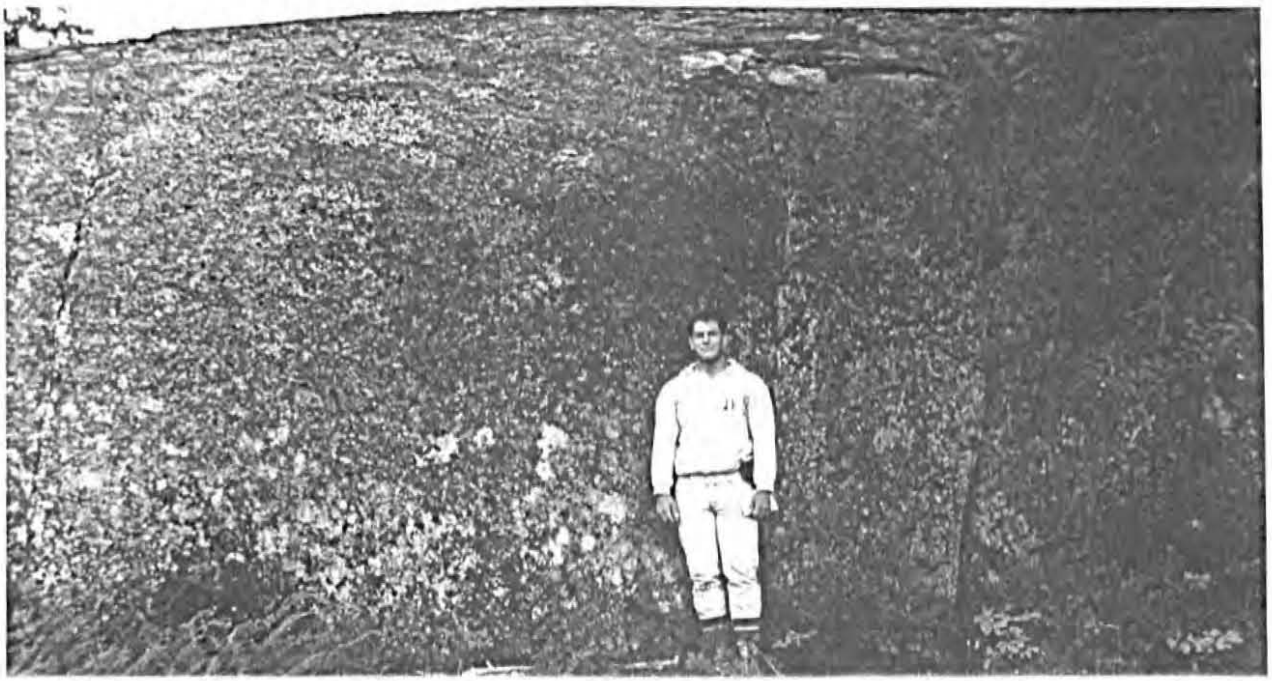


Figure 8: High ledge in the red granite of the "Tie Creek Basin". This indicates that large blocks may be removed from the outcrop.

Figure 9: Chainlink fence anchored in rock to protect the Tie Creek petroform site.

Vertical Joint Spacing in the Betula Lake Pluton

Figures 10 and 11 are joint maps from a proposed quarry site on the amber and red granites. The joint pattern for the red granite site 85-87-24B is wide spaced. The outcrop is formed of regular, step-like, 1-2 m high, 4-6 m wide, ledges. The amber granite is virtually free of vertical joints. If the horizontal joint spacing is wide, blocks of unlimited size could be removed from the amber outcrop. Figure 12 shows the joint spacing of an outcrop outside of the Tie Creek Basin. Note the difference in vertical joint spacing between the three maps. The joint spacing is much wider in the Tie Creek outcrops.

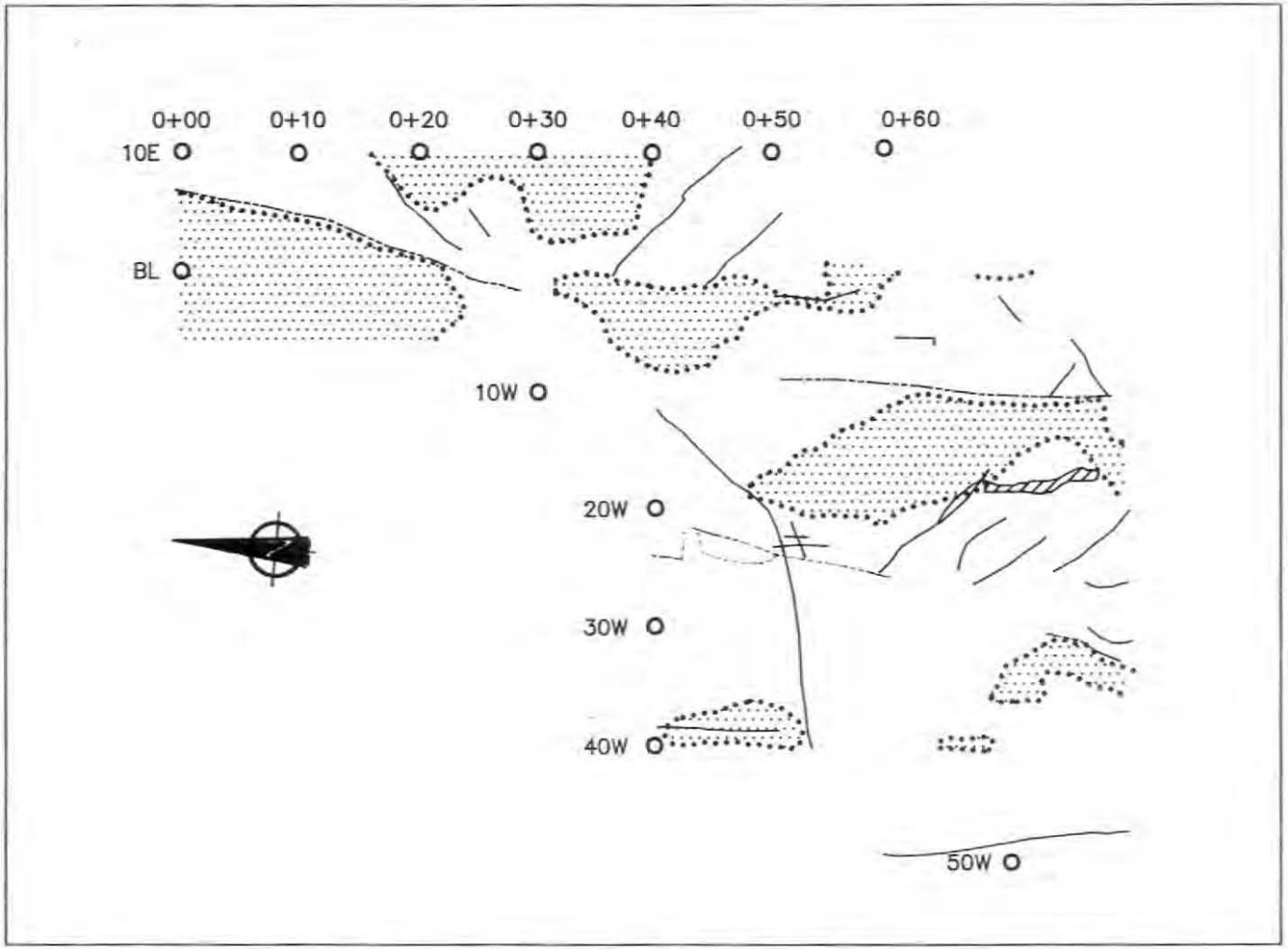


Fig.10 Fracture map of site 85–87–24B, red granite of the Tie Creek Basin.

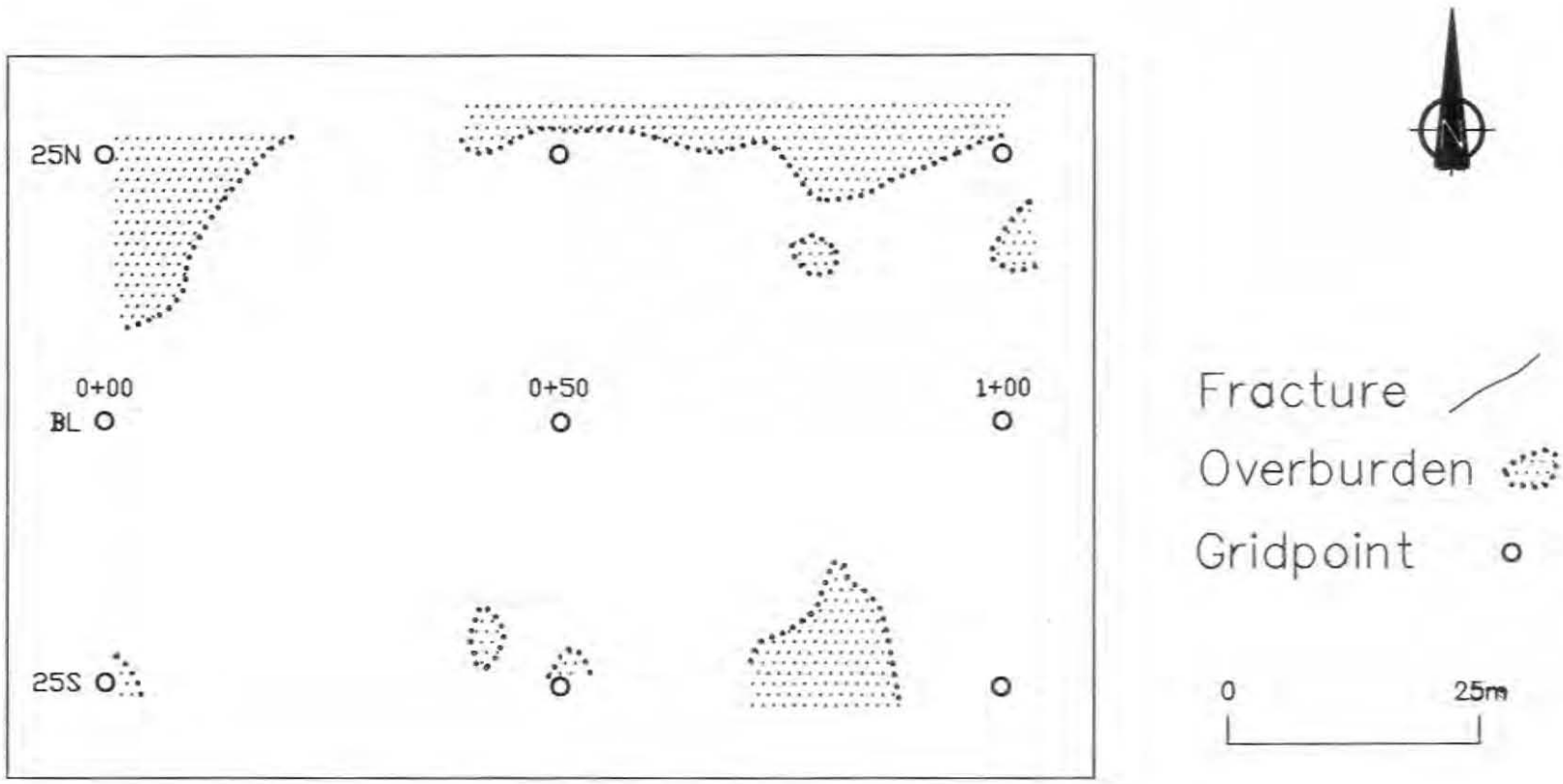


Fig.11 Fracture map of the Tie Creek Basin amber granite. Note the absence of vertical joints.

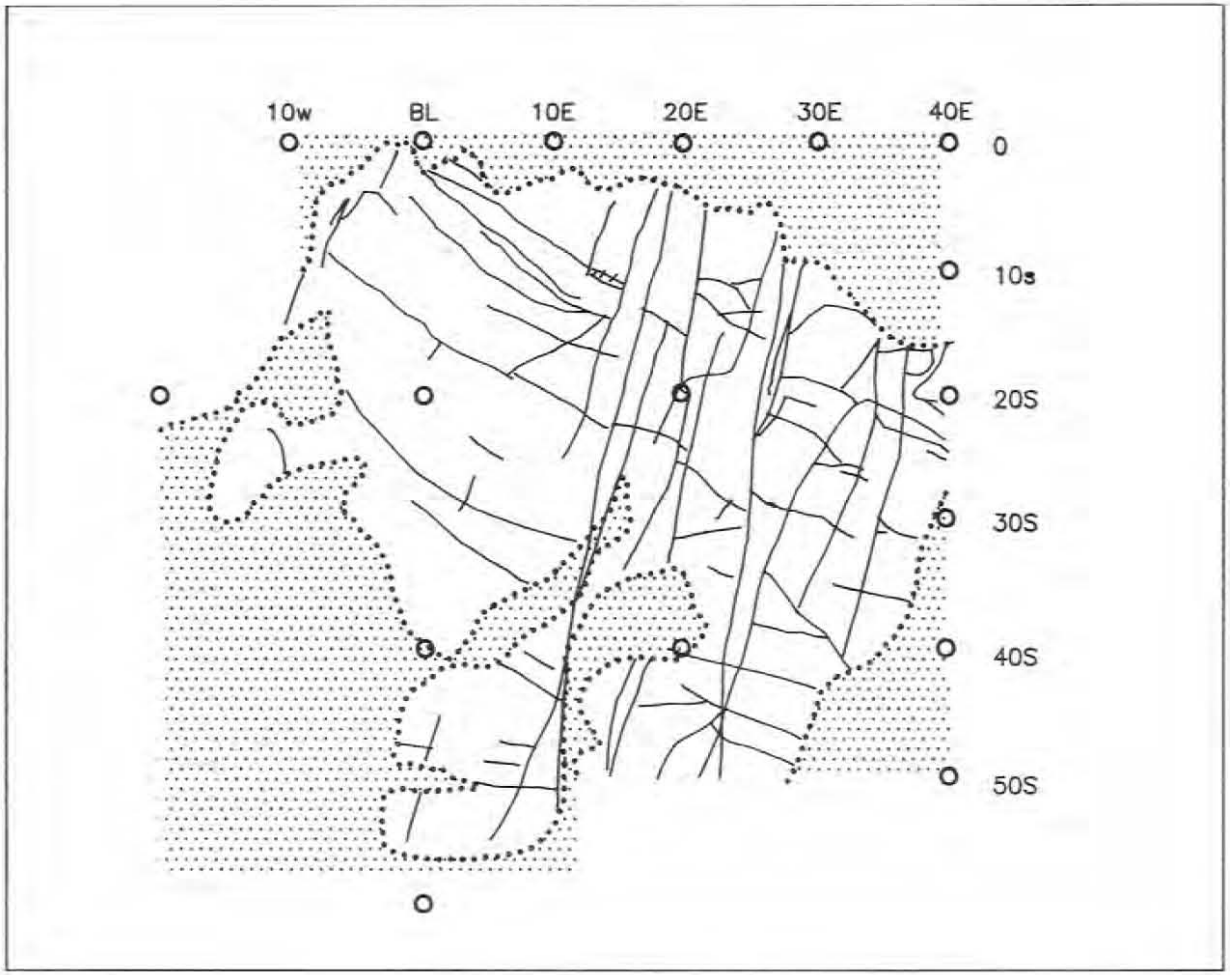


Fig.12 Fracture spacing on a granite outcrop outside of the Tie Creek Basin but within the Betula Lake Pluton.

Canadian Stone Markets

Twenty-eight companies operate 41 quarries in Canada at the present time. Two of these quarries are in Manitoba; the Cold Spring Granite quarry near Lac du Bonnet and the Canadian Shield Quarry near Whitemouth. There are no granite quarries west of Winnipeg; Manitoba quarries are the closest to a vast western market in Canada and the United States (Fig. 13). Geologically, there are no potentially quarryable granites in the southern prairie provinces between southeastern Manitoba and southern British Columbia. Quarries in southeast Manitoba are strategically located to supply the western Canadian and American markets.

Figure 12a: Aerial view of the Shield quarry

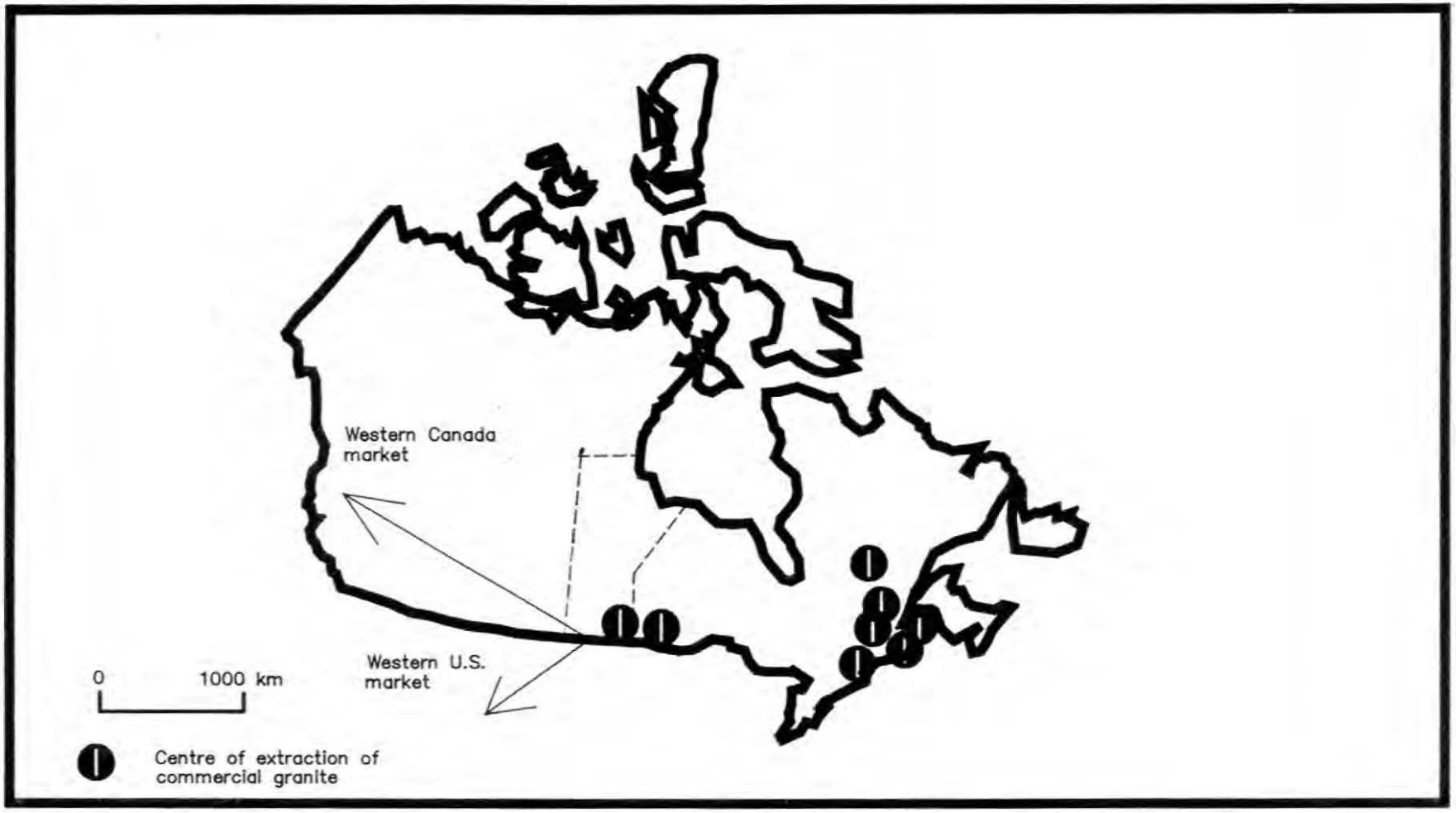


Fig.13 Main centres of extraction of commercial granite. Note the potential market area of the western United States and Canada that is accessible to Manitoba.

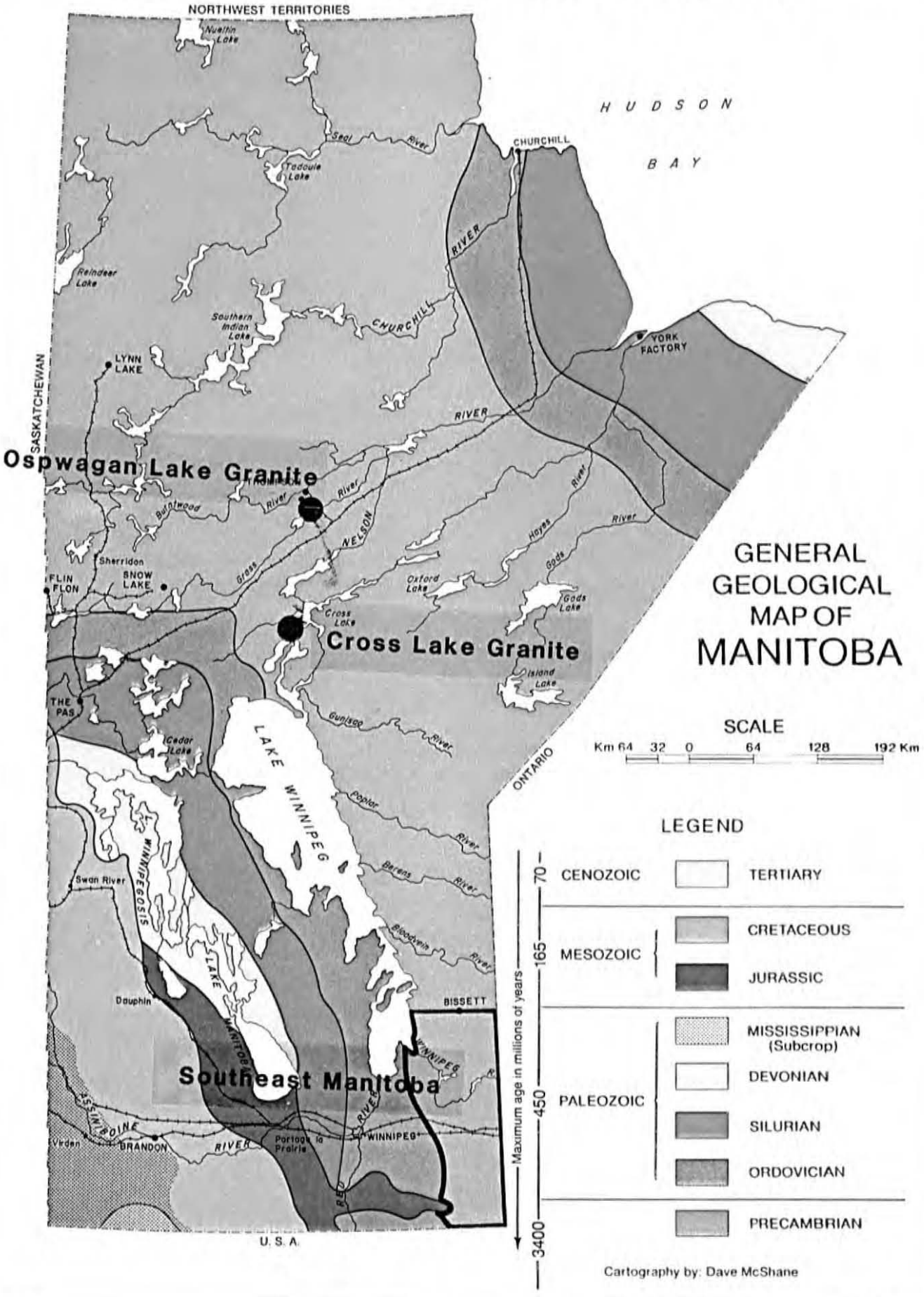
Dimension Stone Potential of Manitoba

In response to requests from industry, Manitoba Energy and Mines spent three years establishing an inventory of potential dimension stone sites in Manitoba. Studies have been conducted in northern and southeastern Manitoba (Fig. 14). Roads in the north generally access the metal mines and associated communities. Massive sulphide and gold deposits are found in areas where the rock has been deformed, folded, faulted and altered, rendering it inhomogeneous in colour and texture, highly fractured and rich in minerals that will rust. Although granitic plutons with building stone potential may occur in northern Manitoba, most are not road accessible.

Most of the bedrock of southern Manitoba is composed of Paleozoic and Mesozoic limestones and shales. Outcrops of Precambrian granite occur east of Lake Winnipeg north of the Trans-Canada Highway. South of the Trans-Canada, the rock is under a thick cover of swamp, till and clay, and is therefore inaccessible.

Shipment of rock by road and rail from northern Manitoba is considerably more expensive than shipment from southeast Manitoba to Winnipeg. A stone deposit from northern Manitoba must be an unique and high profit stone such as black, green or blue granite. A quarry producing pink granite near Flin Flon could not compete with a pink granite from Vermilion Bay, Ontario.

Fig.14 Sites of Potential Granitic Building Stone Deposits



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Dimension Stone Potential of Southeast Manitoba

The area surveyed during the dimension stone inventory of southeast Manitoba is shown on Figure 14. All rock units in this region, whether of high or low potential were researched, examined, sampled and documented.

The two fold-out geological maps are the preliminary editions of the NTS 52E and 52L map sheets of the Manitoba Energy and Mines Bedrock Geology Compilation Map Series. The granitic plutons are coloured and sample sites are shown as 'dots'.

Granitic plutons south of the limit of outcrop boundary (Figure 15) are not coloured because they are covered with thick overburden. Granitic rocks north of the plutons coloured on Figure 16 were found to be far too fractured and heterogeneous in colour and texture to have any potential as sources of dimension stone.

The characteristics of all granitic intrusions and their rankings as potential sources of dimension stone are shown in Table 2.

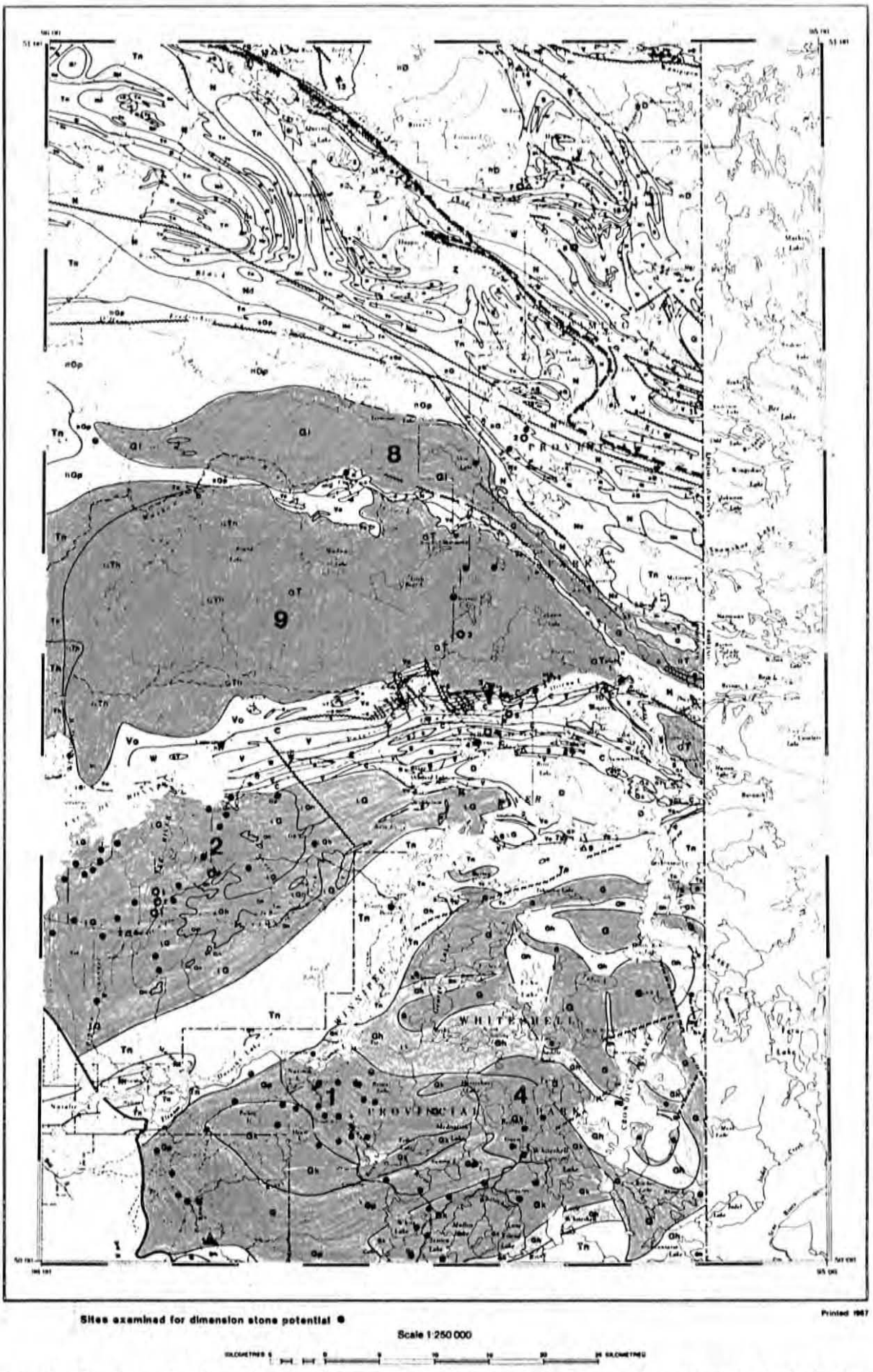


Figure 15: Sites examined for dimension stone potential in the south part of the southeast Manitoba study area.

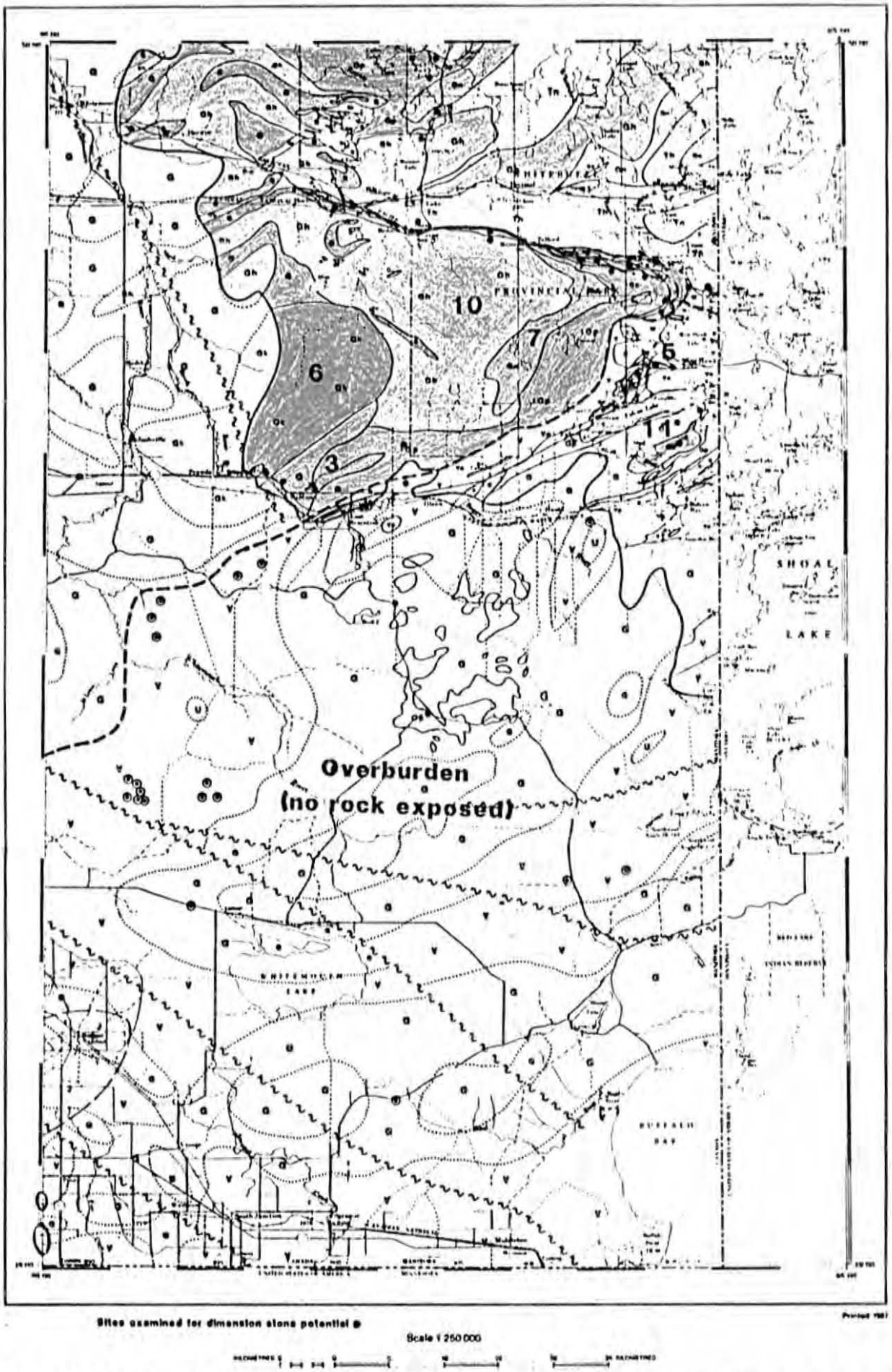


Figure 16: Sites examined for dimension stone potential in the north part of the southeast Manitoba study area.

Table 2. Ranking of Granitic Plutons for Dimension Stone Potential

Rank	Type	Advantages	Disadvantages
1)	Betula Lake Pluton Porphyritic[1], granite massive outcrops of high potential located in the Nutimik Lake area, east of P.R. 309	- Tie Creek area; massive outcrops with virtually no vertical joints. - attractive variety of colours. - attractive porphyritic texture. - outcrops several km from cottage sites. - most outcrops accessible by road.	- high percentages of altered sphene[2] in outcrops of red granite. - some microfracturing mainly in red granite. - occasional large pegmatites[3].
2)	Lac du Bonnet Batholith	- young intrusion, relatively undeformed in the central part of the batholith. - average joint spacing of 1 m on 4% of outcrops (Tammemagi et al.) - two colours: amber and pink. - good road access.	- 96% of outcrops have joint spacing less than 1 m. - ubiquitous, close spaced horizontal and vertical spaced pegmatite dykes (as evidenced on surface, in drill core and the URL shaft). - competition from the operating quarry that is producing pink granite from this batholith - the 100 x 100 m amber outcrop may be too small to quarry.
3)	Pink granite.	- massive, sparsely jointed outcrops in McMunn area near Trans-Canada.	- generally poor access. - nondescript pale pink colour and fine grained texture. - outcrops are low and in swamp, near the top of the water table.
4)	Red microcline granite.	- massive outcrops with few vertical joints. - very coarse grained texture. with attractive schiller[4] on feldspar[5] crystals.	- crumbles to a depth of 8 m as indicated by drill core. - homogeneous outcrops are located within 1 km of cottages.

Table 2 continued

Rank	Type	Advantages	Disadvantages
5)	Falcon Lake Igneous Complex	- dark grey to black colour. - coarse grained texture. - access to Trans-Canada.	- contains numerous quartz veins, offsets, and intrusions of succeeding phases. - erratically spaced and oriented fractures. - contains iron-bearing minerals that will rust.
6)	Microcline[5] granite	- few massive, pink, coarse grained outcrops with wide joint spacing.	- most of pluton is not accessible. - outcrops in accessible areas are small and low-lying in swamp.
7)	Gneiss	- good exposure and road access. - some very attractive colours and porphyroblastic textures.	- close joint spacing. - shallow dipping joint sets striking in at least four directions. - heterogeneous colours and textures. - inclusions of fine grained pink granite. - abundant closely spaced pegmatite dykes and pods.
8)	Inconnu Granite	- pink colour	- heterogeneous colour and texture. - close joint spacing. - poor access.
9)	Maskwa Lake Batholith		- heterogeneous colour and texture. - insipid colours. - close joint spacing. - poor access.

Table 2 continued

Rank	Type	Advantages	Disadvantages
10)	Gneiss		- nondescript "muddy" colours. - fine grained texture. - close joint spacing. - poor access.
11)	Diorite	- black colour	- close joint spacing - intruded by younger granite visible throughout rock. - no access road within 2 km.

[1] **porphyritic** A textural term which describes igneous rocks containing relatively large crystals set in a groundmass of finer grained crystals.

[2] **sphene** A mineral composed of calcium, titanium, silica and oxygen. It has been altered to calcite (calcium, carbon and oxygen) and anatase (titanium and oxygen) in the Betula Lake Pluton. The altered sphene is a yellow and powdery.

[3] **pegmatite** A very coarse grained igneous rock having a grain size of 3 cm or larger.

[4] **schiller** A peculiar play of light, which appears when certain minerals are examined so that their crystal faces or cleavage faces are at a particular angle to the incident illumination.

[5] **feldspar** A silicate mineral found in many rocks, including granite.

[6] **porphyroblastic** A term applied to the large crystals found in metamorphic rocks, which have grown during metamorpism.

Dimension Stone Potential of Betula Lake Pluton

The "Betula Lake Pluton", ranked number one for building stone potential, is located mainly within the boundaries of the Whiteshell Provincial Park. Road accessible outcrops within this granite have been sampled and documented as indicated by the sample locations on Figure 17. The areas of highest potential within the pluton are shaded dark orange. These two areas coincide with the Canadian Shield Quarry and the "Tie Creek Basin".

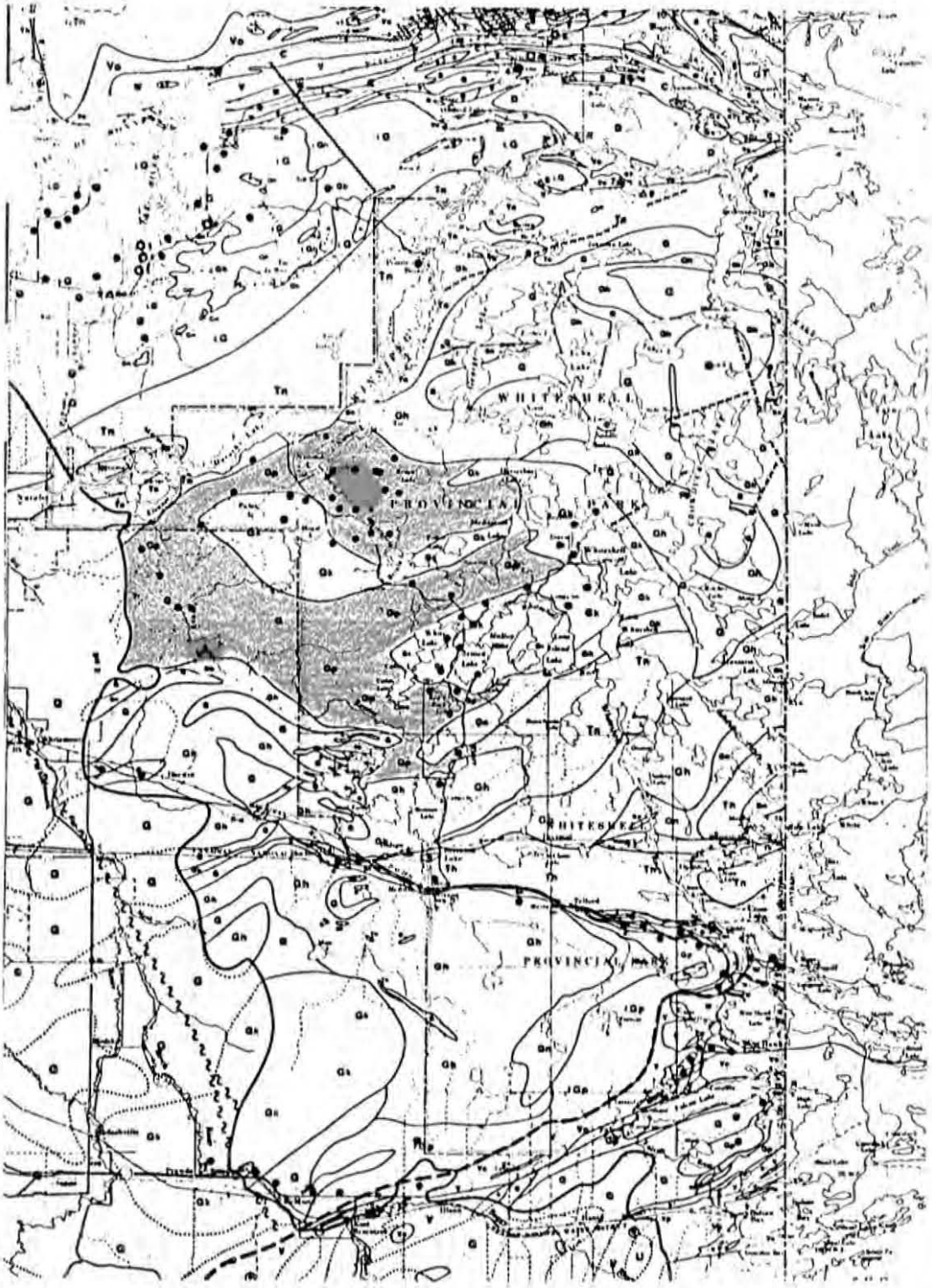


Figure 17: High potential areas of the Betula Lake Pluton in the Whiteshell Provincial Park. The pluton is shaded orange, the high potential areas are dark orange, and the Park boundaries are outlined in purple.

Existing Quarries in Manitoba

The Cold Spring and the Shield granite quarries and the Gillis "Tyndall" limestone quarry are producing dimension stone in Manitoba at the present time. The small size of the quarry pits, the longevity of the operations and the buildings clad in Manitoba stone are described in the following table.

Table 3. PERFORMANCE CHART OF EXISTING INDUSTRIES

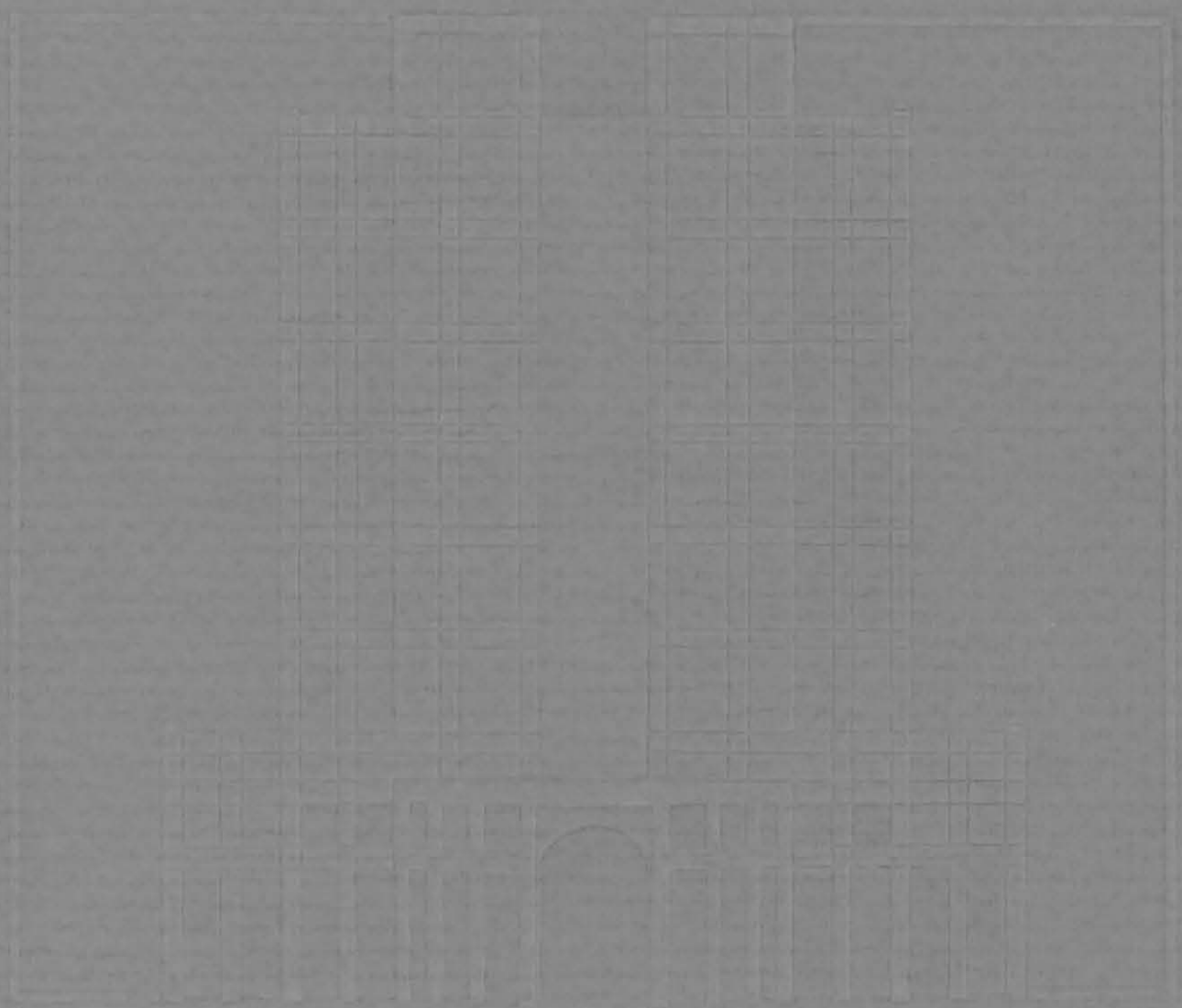
Quarry	Gillis	Cold Spring	Shield
Duration	First quarried in 1831 to build Lower Fort Garry	First quarried in 1932 by Ivor Petursson	First quarried in 1975 by Henry Ehm
Presently Operated by	Gillis family of Manitoba (since early 1900s)	Cold Spring; managed by Sandy Petursson	Vior-Mazarin, Quebec; managed by Curd Hoss
Average Annual Employment	Quarry - 6-8 people Plant and Offices - 44 people	Plant and Quarry - 20 people	Quarry - 6 people No plant as yet
Size of Workings	Pit size 170 x 550 m worked since early 1900s with reserves for many years to come; limited in quarryable depth by thickness of formation	150 x 200 m	2 pits 1) 60 x 150 m 2) 60 x 100 m
Types of Products	Facing stone for buildings, structural stone, stone for carvings, monument stone	Building facings, monument stone, stone for industrial purposes	Building facing, monument stone, curbing, paving
Distribution	Vancouver to Quebec	USA, Canada, China	Canada, Saudi Arabia, Minnesota Illinois, Vermont, South Dakota

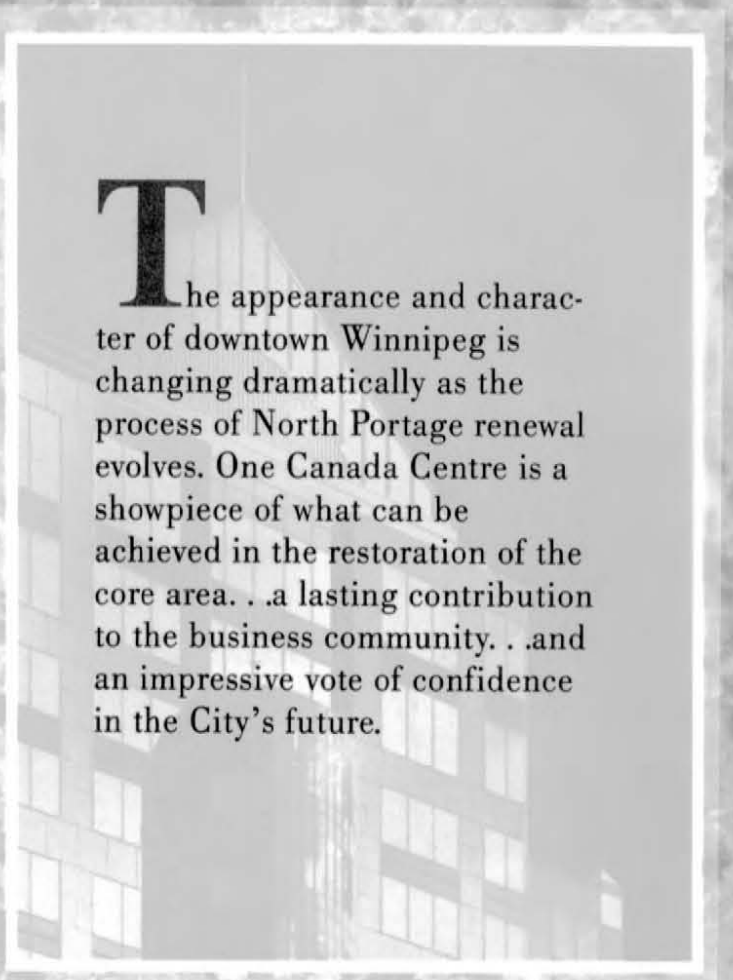
Table 3. continued

Quarry	Gillis	Cold Spring	Shield
Buildings and Products of Note	Lower Fort Garry;Manitoba Legislative Building; Parliament Buildings Hall of Fame; many churches in Winnipeg including Westminster United, St. Ignatius Roman Catholic; T. Eaton Stores in Toronto and Montreal; Winnipeg CNR Station; Hudson's Bay Store, Winnipeg; Saskatchewan Legislative Buildings; Winnipeg Art Gallery; T.C. Douglas Building Regina, Saskatchewan; Sturdy Stone Center, Saskatoon, Saskatchewan; University of Saskatchewan Administrative Buildings; Museum of Civilization, Hull, Quebec; many other large business and apartment buildings in Winnipeg; houses thoughout Manitoba,	Interior of Richardson Building; AECL Building, Pinawa; Manitoba Mint; Exterior of Calgary Hospital; Dofasco and Steel Companies in China; many monuments in Manitoba; facing stone on buildings in Lac du Bonnet; Seven Sisters and Whiteshell Prov. Park;	NRC Building; Monuments USA and Canada; Bath tub of King Fahd of Saudi Arabia; Major building in Quebec City constructed in past six months
Value of Products sold 1986 (Dollars)	Value F.O.B. Plant 3,039,478	Value F.O.B. Plant 244,800 in grave markers; does not include 41,006 cubic feet sent to USA parent company as rough blocks	n/a
Production	26 868 metric tonnes	65,000 cubic feet, approximately 6000 tons	Production of past 6 months, 1666 tons

APPENDIX A

One · Canada · Centre





The appearance and character of downtown Winnipeg is changing dramatically as the process of North Portage renewal evolves. One Canada Centre is a showpiece of what can be achieved in the restoration of the core area. . .a lasting contribution to the business community. . .and an impressive vote of confidence in the City's future.

Growth, Renewal, Commitment. . .

The location of One Canada Centre is significant to both Investors and the community. The decision to erect the building in the North Portage development area reflects the corporate commitment to the city and its revitalization.

Investors has come a long way since it opened its first office in the Power Building at Portage and Vaughan in 1940 with a staff of three and 300 square feet of space.

By 1947, the Company had outgrown the Power Building and head office was moved to the old Manitoba Savings Bank at Donald and Ellice, with 12,000 sq. ft. By 1951, the staff numbered 110.

In 1957, Investors moved to its own building at 280 Broadway, which at first had four storeys. Three additional storeys were added in 1963.

Today, with head office staff totalling more than 600 and supporting a network of Financial Planning Centres across the country, Investors will move to its new headquarters at One Canada Centre in late 1987.

Please accept an invitation from The Investors Group to take a closer look at One Canada Centre and the advantages it holds in store for your company.

An intriguing structure of sunset-red granite and solar green glass, One Canada Centre will anchor the west end of the North Portage redevelopment project — assuming a highly visible and strategic location in Winnipeg's revitalized downtown.

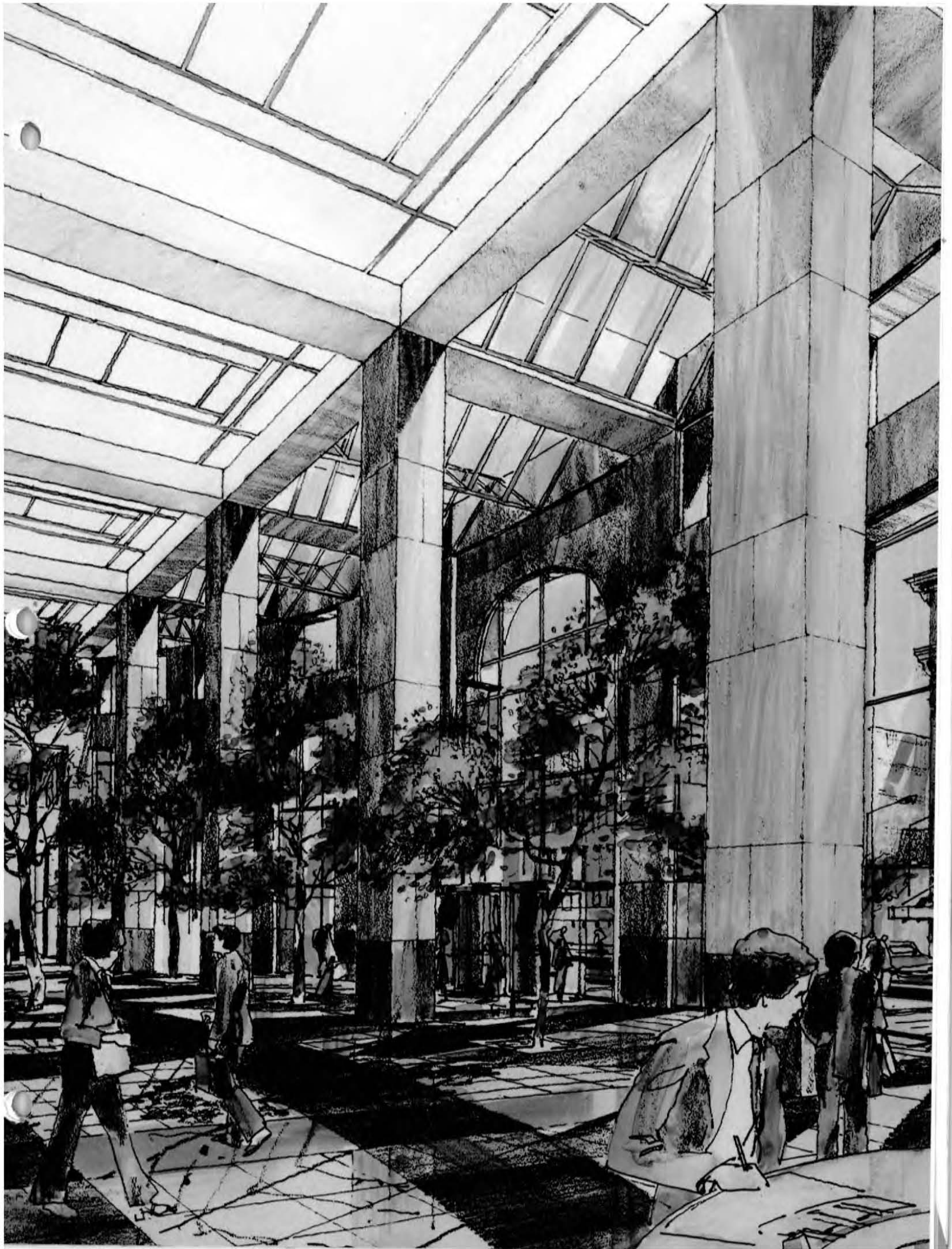
Aesthetics, Form, Function. . .

The entrance to One Canada Centre is a dramatic introduction to what follows within. A spectacular 3-storey glass and granite atrium, it combines polished and flame-cut granite columns, terrazzo floors, lush greenery and vast open space — creating an atmosphere conducive to corporate growth and prosperity. At the same time, it serves as the focal point to its business operation, housing the building control and reception desk as well as important retail financial services.

One Canada Centre has been designed with an exacting attention to detail, providing not only for the uses of the present, but also the needs of the future. Following a theme of maximum flexibility, individual office planning is facilitated by the eight-corner-offices floor plan. And complements to this theme are evident everywhere with two bay window treatments on each floor and vaulted ceilings in each elevator lobby.

Comfort, security and safety are factored into the plans for One Canada Centre in a top-line range of systems and services. Secure, heated underground parking is available on site. Six computer-controlled passenger elevators are programmed to reduce waiting time and anticipate traffic loads. Service and shuttle elevators and enclosed loading docks facilitate all deliveries and shipments to and from the building. And in terms of protection, after-hours access to individual floors is computer card-controlled, enhanced by 24-hour closed circuit t.v. monitored by a professional guard service.

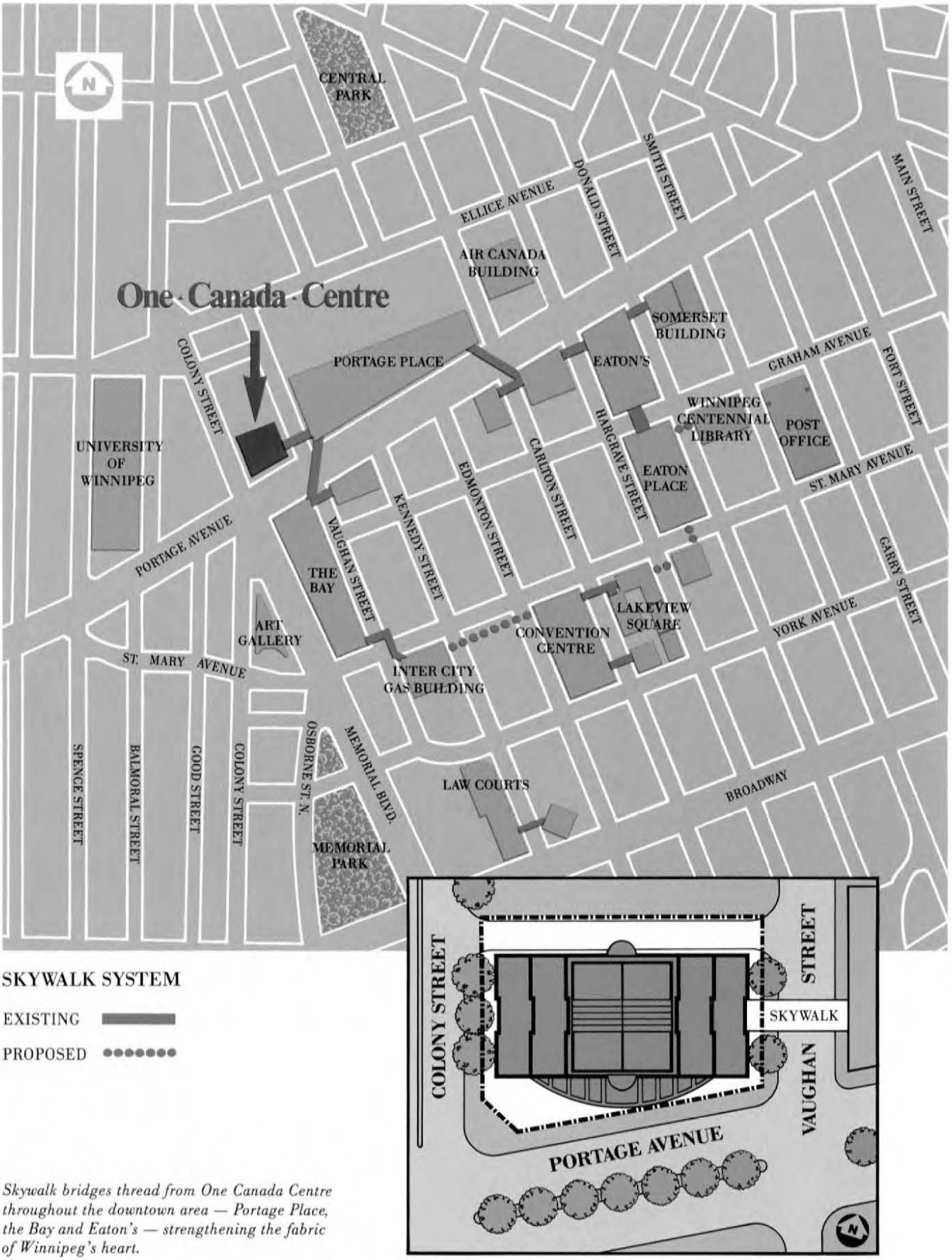
Fronting Portage Avenue, the entrance to One Canada Centre has been designed to complement the building's theme, an aura that will enhance the image of its corporate and professional tenants.



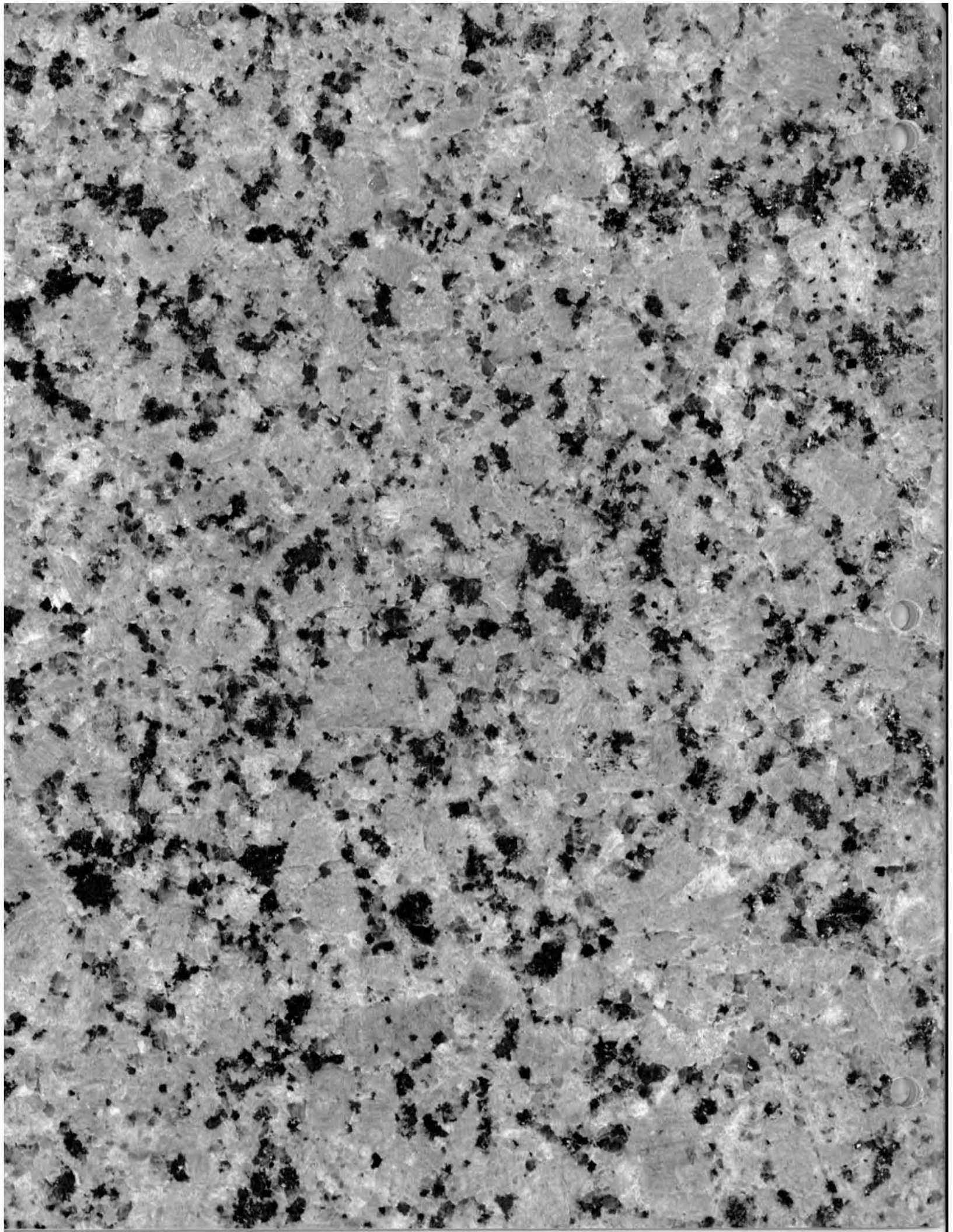
Proximity, Accessibility, Visibility. . .

Located at 447 Portage Avenue, One Canada Centre is an unparalleled opportunity for those companies needing to be at the focus of the business community. Within minutes are the majority of the city's largest corporations, educational institutions and government offices as well as major hotels, popular restaurants and fitness centres.

One Canada Centre is linked at the second floor level with Portage Place, Cadillac Fairview's new 140-store shopping complex. In turn, Portage Place is linked to South Portage Avenue at The Bay and Eaton's. The effect is a transformation of a seven-block-long section of Portage Avenue into a weather protected concourse, flowing west from Donald Street to One Canada Centre, creating a vibrant mixture of shopping, dining, entertainment, offices, recreational and cultural activities.



Skywalk bridges thread from One Canada Centre throughout the downtown area — Portage Place, the Bay and Eaton's — strengthening the fabric of Winnipeg's heart.



Development Team

Development Manager:	Lincor Properties Ltd.
Architect:	The Webb Zerafa Menkes Housden Partnership
Associate Architect:	Number Ten Architectural Group
Structural Engineer:	Crosier, Kilgour & Partners Ltd.
Mechanical Engineer:	K&D Engineering
Electrical Engineer:	a.e.b. Engineering Group
Interior Designer:	Rice Brydone Ltd.
General Contractor:	PCL Constructors Western Inc.

Exclusive Leasing Agent:

Lincor Properties Ltd.

1500 - 444 St. Mary Avenue
Winnipeg, Manitoba
R3C 3T1
(204) 942-7664

Building Specifications

Location:
447 Portage Avenue between Colony and Vaughan Streets

Height:
19 Storeys

Area:
Approximately 320,000 square feet (gross)

Structural System:
Reinforced concrete flat slab structure founded on concrete caissons on bedrock.

Curtain Wall:
Sunset-red polished granite and solar green dual pane insulated glass with applied low emissivity coating to reduce glare and heat gain or loss.

Parking:
Computer controlled card access to a two-level heated underground parking garage for tenants. Ample casual parking is also available in the immediate area.

Building Security:
After hours access to parking garage, elevators and individual floors is computer card-controlled, enhanced by 24-hour closed circuit t.v., motion detectors and door contacts; monitored by a professional guard service.

Loading and Service Area:
Shuttle and service elevators, plus three supervised enclosed loading docks to facilitate deliveries and shipments to and from the building.

Life Safety:
Sprinklers, smoke detectors and annunciators on each floor are all centrally monitored around the clock to offer maximum life safety protection. Emergency power is provided by a stand-by generator.

Elevators:
6 high speed Otis Elevators, programmed to reduce waiting time and anticipate traffic loads; 1 parking garage shuttle, 1 service elevator.

Typical Floor Height:
Slab to slab — 12 feet
Floor to ceiling — 8 feet, 7-1/2 inches

Heating, Ventilation, Air-Conditioning:
Computer controlled variable air volume system with perimeter radiation heating units. Two central chiller units and individual fan rooms on each floor make after hours heating and cooling simple, efficient and inexpensive. Individual temperature controls provide independent heating and cooling for defined office areas.

Office Lighting:
20" x 60" recessed fluorescent fixtures with energy saving ballasts delivering average illumination of 60 foot-candles per square foot on an open area basis.

Planning Module:
Efficient 5 ft. x 5 ft. module for greater choice of office size and ease of subdivision.

Planning Features:
Eight corner offices and 2 bay window treatments per floor allow a significant amount of premium office space to each tenant. A typical floor plan also includes an excellent floor area to window ratio.

Attractive Individual Lobbies:
Each floor lobby features a "vaulted" ceiling and high quality carpeting complementary to the main lobby theme.

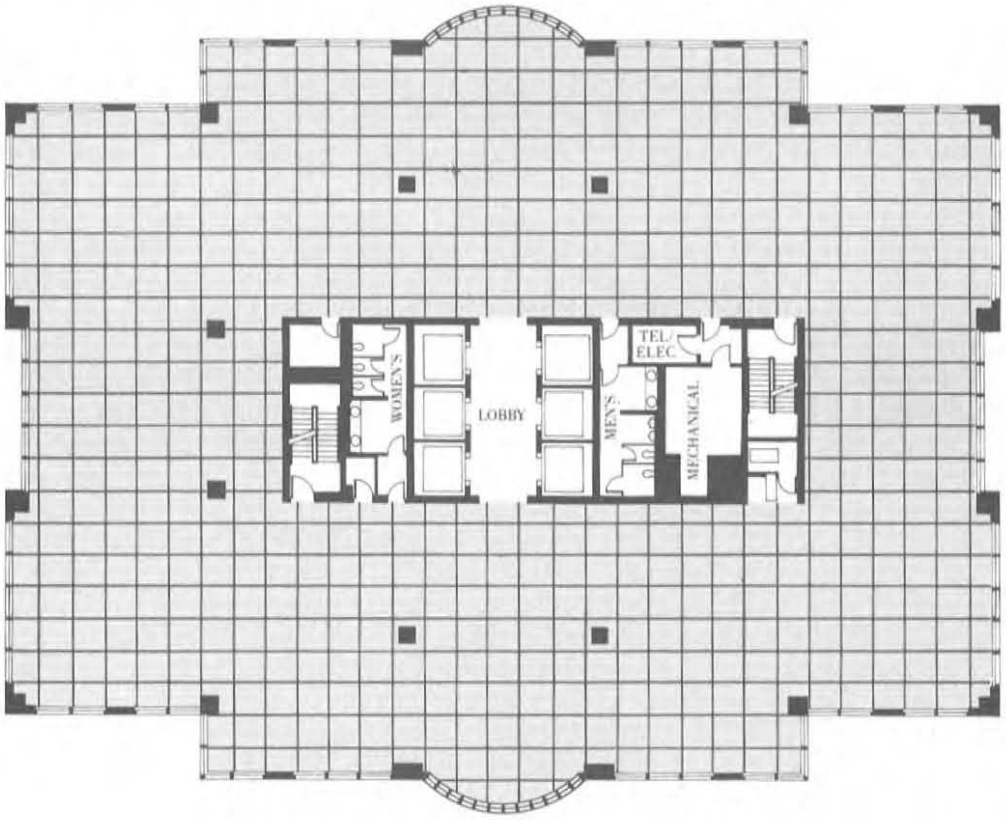
Exclusive Leasing Agent:

Lincor Properties Ltd.

1500 - 444 St. Mary Avenue
Winnipeg, Manitoba
R3C 3T1
(204) 942-7664

Typical Floor Plan

COLONY STREET



VAUGHAN STREET

PORTAGE AVENUE

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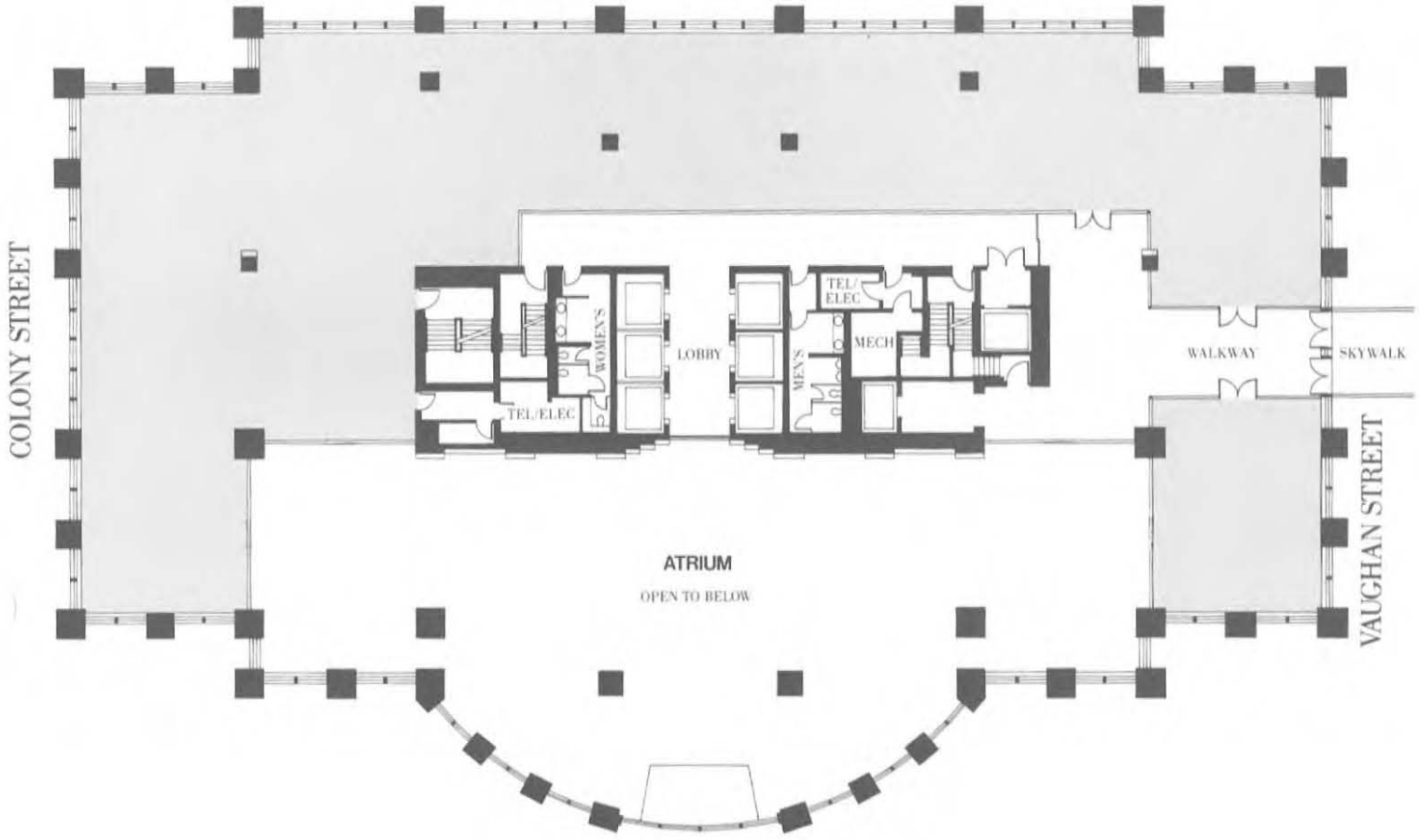
Second Floor Plan



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Main Floor Plan

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Wayne G. Chernecki
Vice President,
Marketing

Lincor Properties Ltd.

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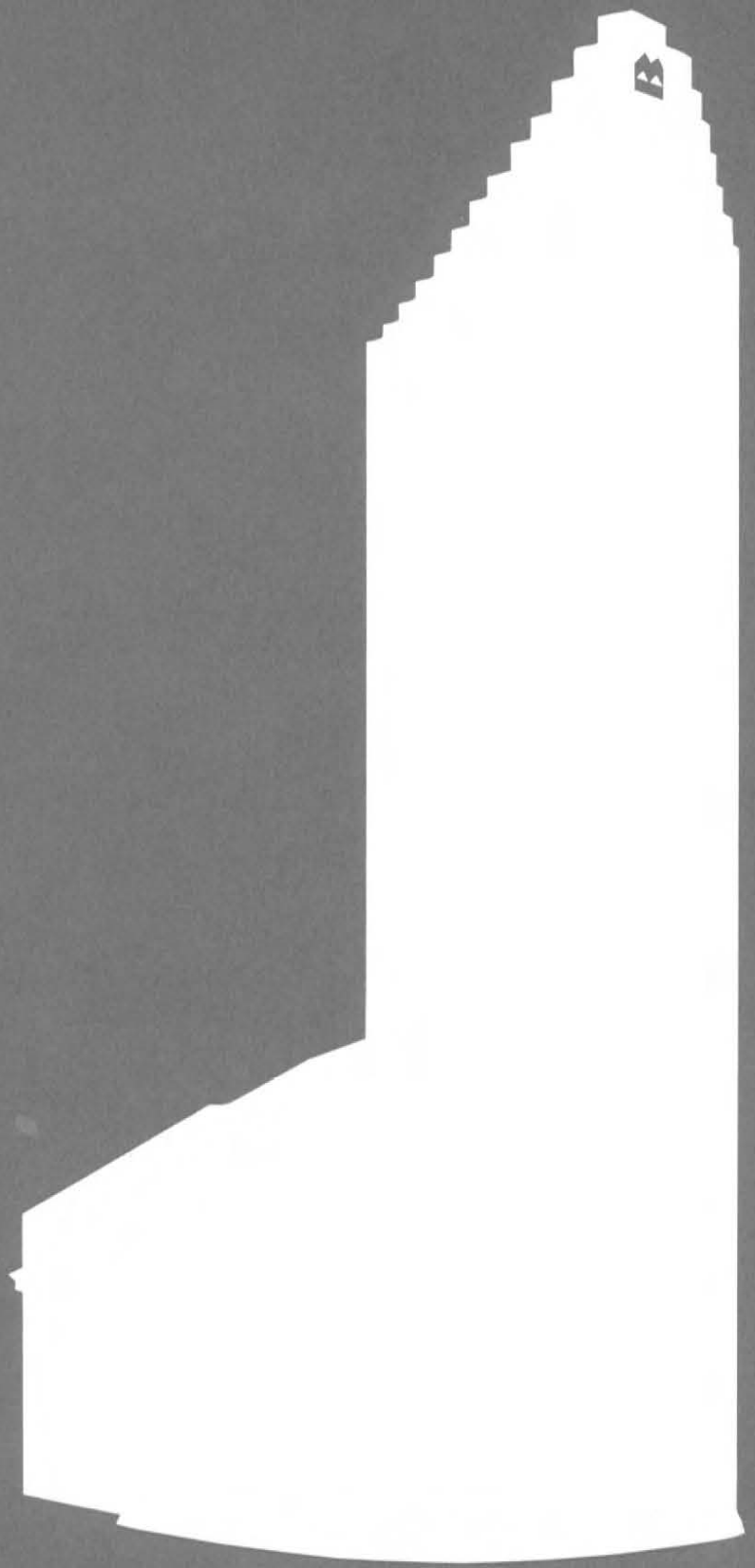
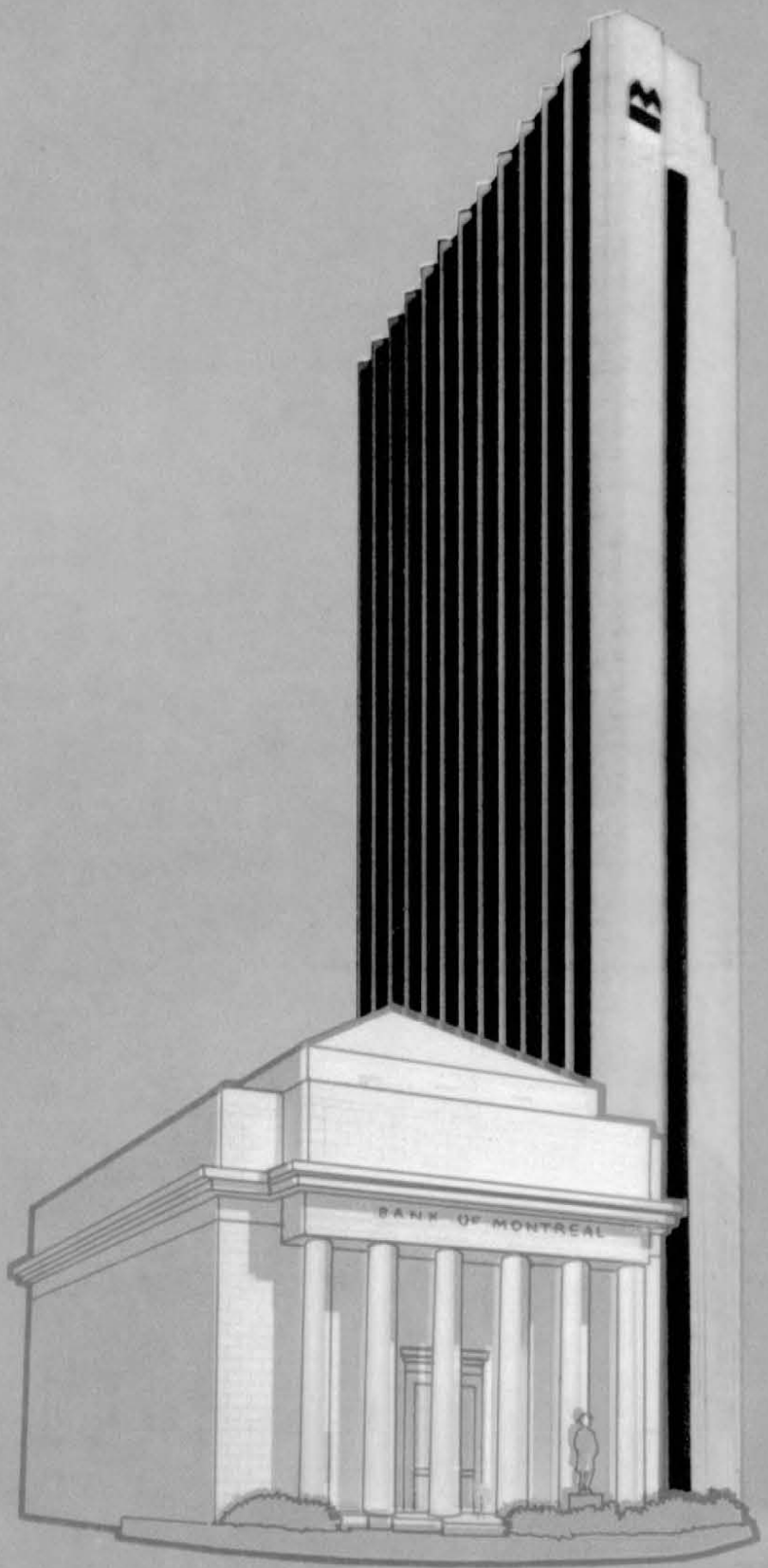


Bank of Montreal Building

Winnipeg, Manitoba



Bank of Montreal Building

Portage and Main, Winnipeg, Manitoba

A skillful integration of the existing building with a dramatic new tower

More Than a Century of Service in Winnipeg

Bank of Montreal's Winnipeg Main Branch, on the southwest corner of Portage Avenue and Main Street, is an architectural landmark for all of western Canada. Completed in 1913, it is a fine example of the Italian Renaissance revival which inspired some of the most beautiful monumental public buildings in North America. Historically as well, the main Branch is an important site, marking a transition between Winnipeg's early years as a booming but raw frontier town, and the affluent city that was to become a commercial and cultural centre.

Bank of Montreal opened its first Winnipeg branch in 1877, the year the first shipment of prairie wheat was sent to Europe. Offices were in a building owned by the Hudson's Bay Company, adjoining the trading post of Fort Garry. Population of the city at that time was some five thousand Indians, Métis, traders and settlers, but four years later, with the arrival of the Canadian Pacific Railway, it was to soar to 25,000. By 1910, population had reached almost 130,000.

The great transcontinental railway project, which opened up the west to settlement and international commerce, was financed by Bank of Montreal. It was thus natural that, when in 1881 the Bank constructed a sturdy red brick building near the present site of the Main Branch, the CPR rented the second floor. Shortly afterwards, this building was gutted by fire, and both businesses moved into the nearby Knox Presbyterian Church, whose congregation had gone to larger premises. Bank of Montreal occupied the church proper, while William Van Horne directed construction of the transcontinental railway from the vestry and Sunday school.

Eventually, the Bank returned to more conventional accommodation in the red brick building. By the early 20th century, however, the glowing optimism of the times dictated that an imposing building was in order, in keeping with Winnipeg's role as the hub of western development.

Bank officers turned to the New York firm of McKim, Mead and White, one of the most celebrated in North America, which had brilliantly executed a massive renovation of the Montreal Main Branch some years earlier. Other major achievements of this firm, known for elegant private residences and monumental public buildings in the style of the Italian Renaissance, include the Boston Public Library, Columbia University, the Pennsylvania Station in New York City, and The Minneapolis Institute of Arts.

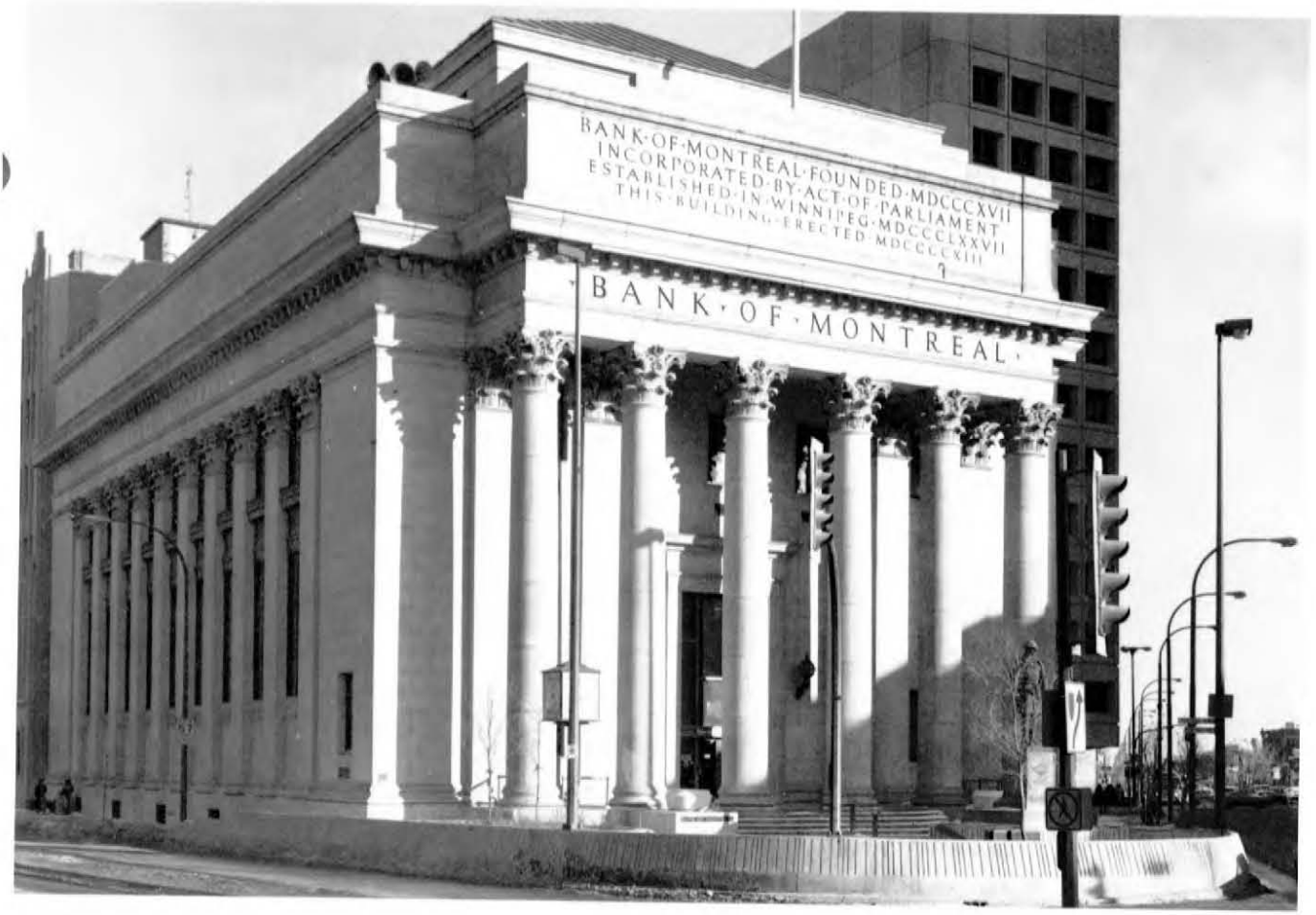
The exterior of the building is a vigorous modern interpretation of the facade of the Montreal Main Branch, completed in 1847 and considered an impeccable example of classical architecture. The inspiration for this facade was the Roman Pantheon, but the Winnipeg version is clearly a twentieth century design, meant to convey the impression of strength, stability, and permanence to a town still on the fringes of settlement. The austere portico contains six unfluted Corinthian columns, four feet nine inches in diameter, weighing 12 tons each, and rising fifty feet above street level.

The words "Bank of Montreal" are carved into the massive entablature above the colonnade, and a more detailed inscription is chiselled into the parapet crowning the front elevation: "Bank of Montreal, founded 1817/Incorporated by Act of Parliament, Established in Winnipeg 1877/This Building erected 1913."

As was typical of buildings designed by McKim, Mead and White, great stress was placed on the high quality of materials used. The structural steel framework, resting on a foundation extending to bedrock, is covered with granite quarried in Bethel, Vermont. Within the main banking hall, floor, columns, and counters are finished in marble from Botticino, Italy. The ceiling, reaching almost sixty feet above the floor, is finished in gold leaf, estimated in 1980 to be worth $1,000,000. Cost of the whole building in 1913 was $1,175,000.

The interior of the building, despite the massive effect of the high ceiling and great Ionic columns, gives an impression of tranquility and pleasing scale. Clerestory windows suffuse the hall with light, and the soft patina of the marble provides an ambiance of warmth. An extensive renovation in 1975 brought in modern heating, air conditioning and life safety systems and restored the building to its 1913 elegance. Completion of the renovation marked the Bank's 100th anniversary in Winnipeg.

The new Bank tower now being constructed adjacent to the Main Branch displays the same aesthetic principles as the older building, offering a contemporary interpretation of classical architectural values. The beautiful Main Branch Banking Hall will open into the lobby of the new building. This major building project reaffirms the Bank's commitment to the heart of the Winnipeg business district, at Portage and Main.



Western Canada Pictorial Index

Top – The main Winnipeg branch of the Bank of Montreal as it stands to-day at the corner of Portage and Main.

Left – The interior banking hall of the main branch showing the 60 foot high ceilings and the massive Ionic colonnade supporting a mezzanine floor.

Above – The intersection of Portage Avenue and Main Street as it appeared in 1890.

At Canada's Most Famous Corner

Tenants of the Bank of Montreal Building will enjoy the comfort and convenience of direct connection from the Bank Building to the Pedestrian Underground Concourse at Portage and Main.

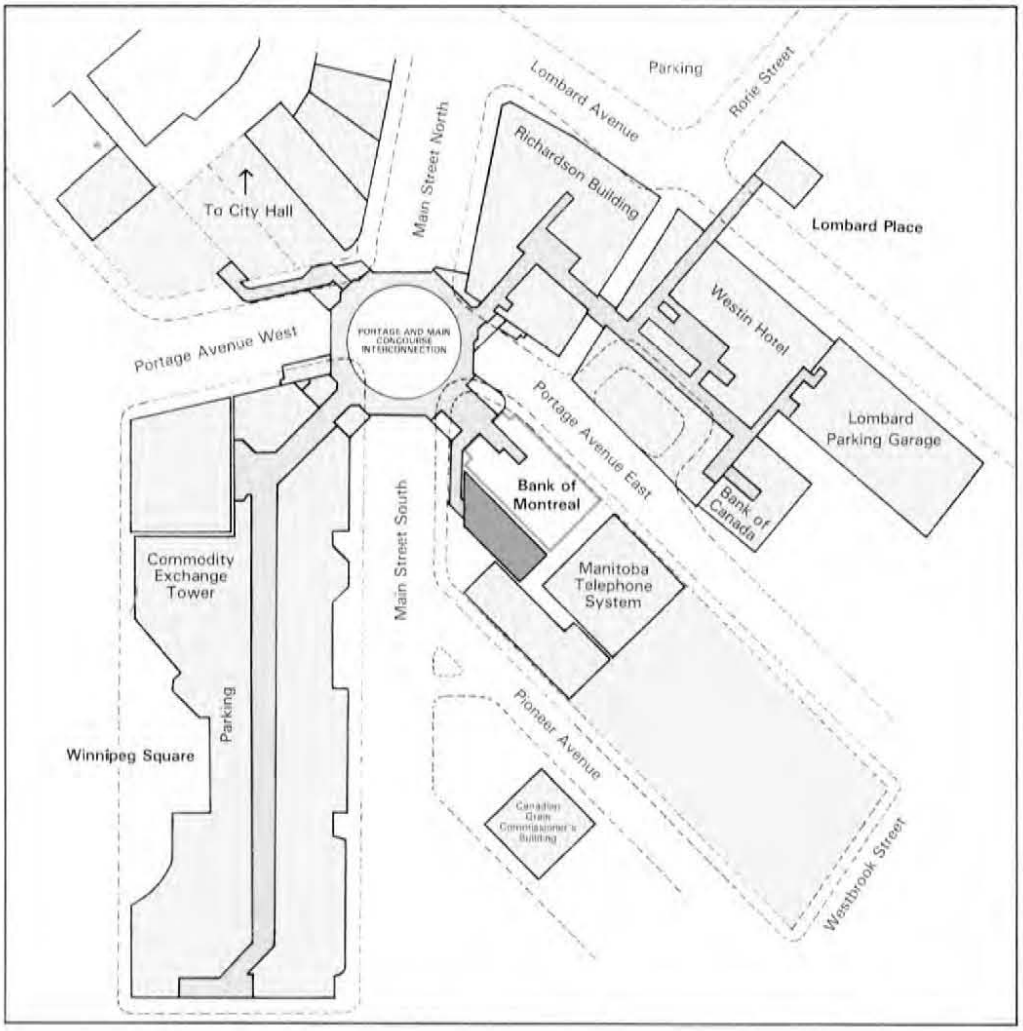
Commenced in February of 1977 and opened exactly two years later at a cost in excess of $7,000,000, this underground walkway provides pedestrian access and protected passage from the four corners of this renowned and windy intersection. Here the building's tenants may browse, snack and shop in a pleasant, complete climate controlled environment.

The shopping area comprises ten stores centrally located around the City operated Concourse and approximately 150 other shops and boutiques in the adjoining malls of Lombard Place and Winnipeg Square.

This Concourse is the key to the eventual completion of a climate controlled pedestrian system that will stretch from City Hall and the Civic Centre complex, across to the Centennial Centre, down to Portage and Main and west to the Convention Centre, the Centennial Library and the Legislative Building.

Lombard Place

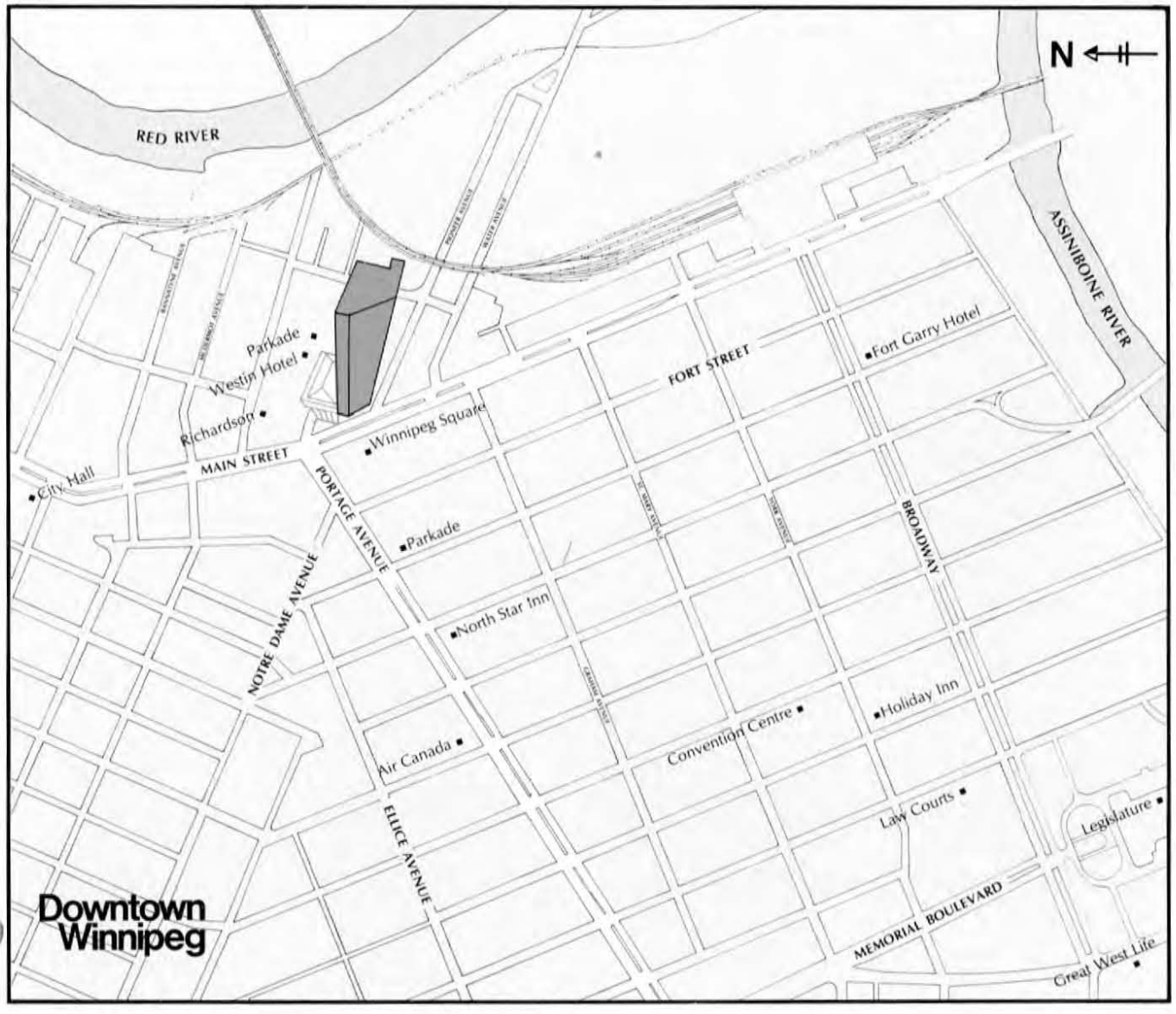
Winnipeg Square



The Development

The site of the new building is adjacent to the south side of the Bank of Montreal Main Branch, on the corner of Portage Avenue and Main Street. The 26-storey tower contains over 150,000 square feet. With net space of about 7,000 square feet per floor, the Bank of Montreal Building is ideal for professional, agency or branch offices.

The building is particularly well-suited to smaller businesses which can utilize an entire floor. In addition, many floors are designed for further subdivision, permitting a choice between full or multiple tenancy occupancy.



Features

Location

Strategically located at the heart of Winnipeg's downtown business core at Portage and Main, the Bank of Montreal Building will give a new dimension to the thriving business district of the City.

The Bank of Montreal Building is central to all of the resources necessary to the conduct of business and to the enjoyment of the City's many dining and entertainment facilities.

In addition, the building connects directly to the underground pedestrian concourse system with its many shops and restaurants.

Indoor Parking

The underground concourse connects directly to indoor parking for over 1,000 cars.

Exterior Appearance

An attractive white, polished granite exterior will cover a solid concrete framework. To enhance the clean architectural lines, aluminum spandrels anodized in bronze will frame the windows.

Entrance and Lobby

Entrance to the building will be through a spacious lobby at street level, the walls and floor of which will be covered in granite, to match the exterior. The ceiling is over thirty feet high. Access to the Bank of Montreal Main Branch will be just off the lobby, but set well apart from the reception areas and elevators used by building tenants.

Elevators

Four high-speed Otis elevators will serve all levels of the building, providing direct access to reception areas on each floor.

Energy Conservation and Comfort

Efficient energy use has been a primary concern in building design. Windows, which extend the full height of the ceilings, are triple-glazed, an energy-saving feature still most unusual in North America.

The heating and cooling systems provide tenants with optimum control of the environment in their individual zones. A series of several water-source heat pumps and a computerized control centre permit efficient, flexible distribution of heat and fresh air throughout the building. The system is designed for flexibility and easily adapts to specific tenant requirements.

Lighting

On typical office floors, fluorescent fixtures using two lamps per fixture provide the overall initial illumination. Energy conservation encourages the use of task lighting and the lighting system is so designed that additional fixtures, as required by the individual tenant layouts, can be provided at minimal cost.

Life Safety Systems

The most modern fire, smoke detection and control systems have been incorporated into the overall building design.

The building has a wet sprinkler system and an automatic standby generator provides electrical services in case of emergency.

Security

The Bank will maintain security systems to control access to areas occupied by tenants.

Accessibility for Handicapped People

Needs of the handicapped have been taken into account throughout the building design. Access ramps are provided in the lobby areas and washrooms designed for the handicapped are located on several office floors.

Additional Features

Windows extend from the floor to the full height of the 8'4" ceilings allowing for an unobstructed view as well as the inclusion of natural light and the aesthetic value in interior design. Vertical blinds, in a neutral tone, will be provided as a building standard.

Heating and/or cooling, by nature of the heat pump system, automatically change from one to the other depending upon the need. This eliminates the discomfort usually experienced seasonally, when systems have to be shut down to be changed over.

Floor Areas

The gross floor area is approximately 8,000 square feet. The net floor area for a single tenant is approximately 7,000 square feet. Net floor area for multiple tenancy is approximately 6,000 square feet.

Occupancy Schedule

Construction commenced in the spring of 1982, with initial tenant occupancy anticipated for late 1983.

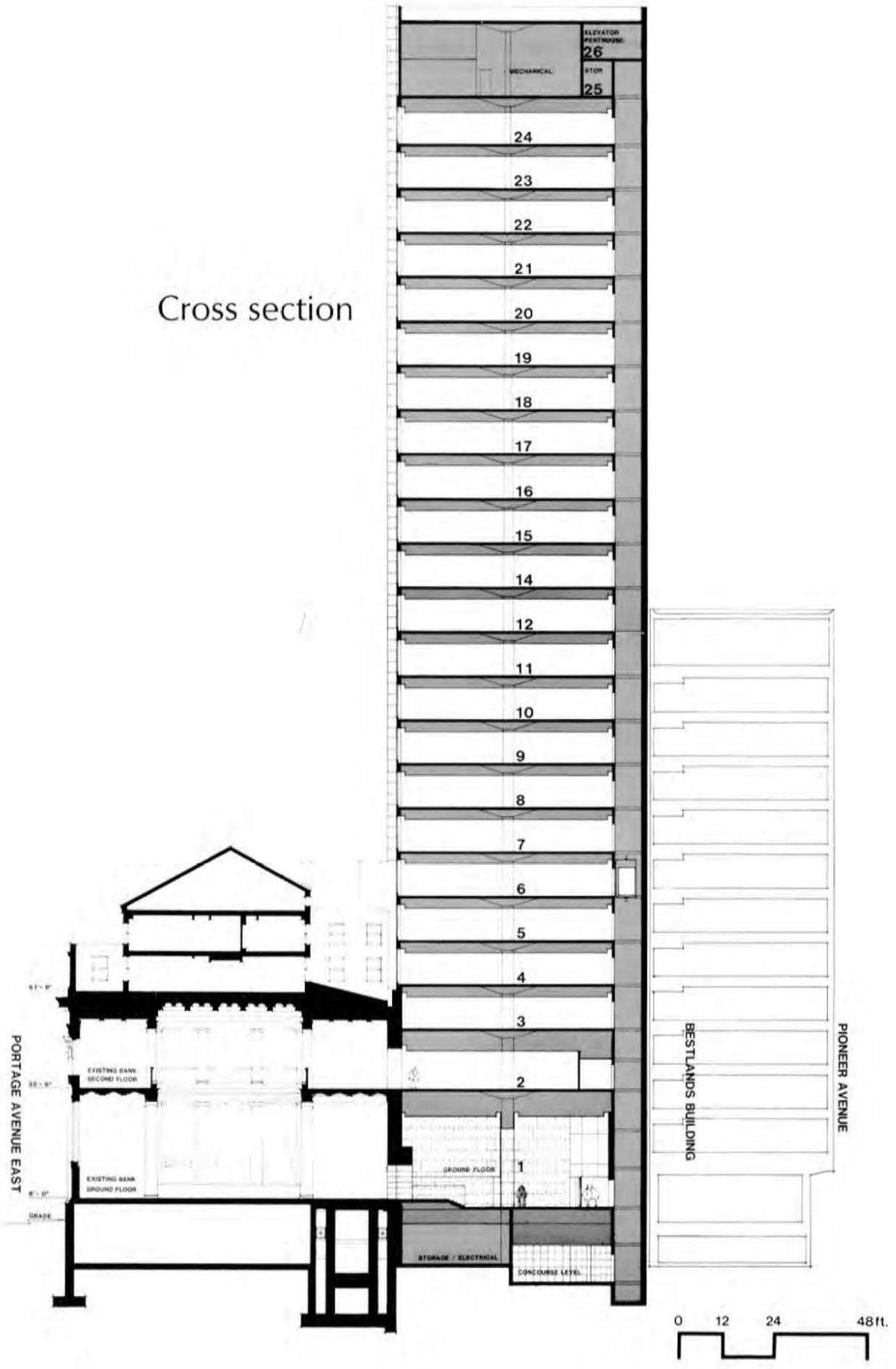
Winnipeg's City Hall and several other civic buildings are within half a dozen blocks of the new tower.

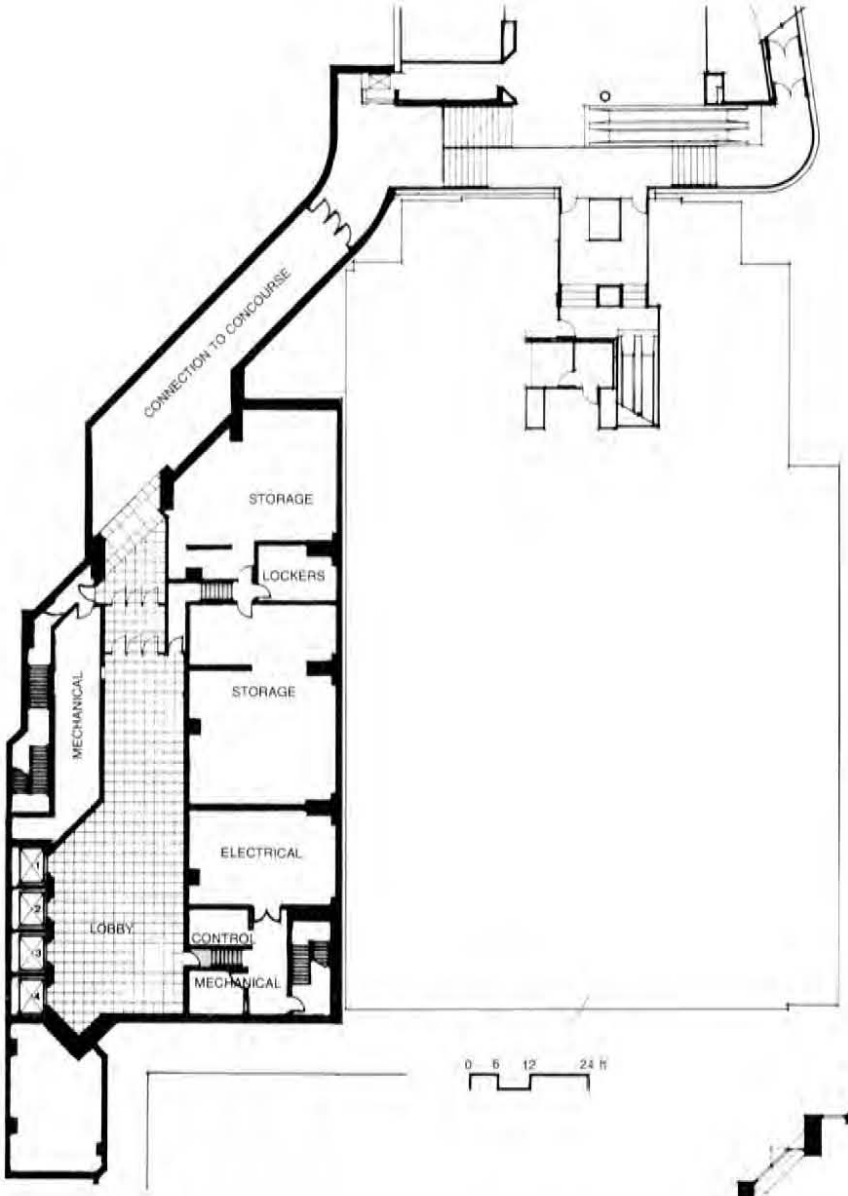
The Westin Hotel
A choice of conveniently located hotel accommodation and many excellent dining establishments are in the immediate vicinity of the new Bank Building.

Winnipeg Convention Centre is located only eight blocks from Portage and Main. Its facilities include exhibit space of 78,000 square feet – a convention floor accommodating 7,200 people – a banquet hall to service 5,000 and 18 flexible and separate meeting rooms.

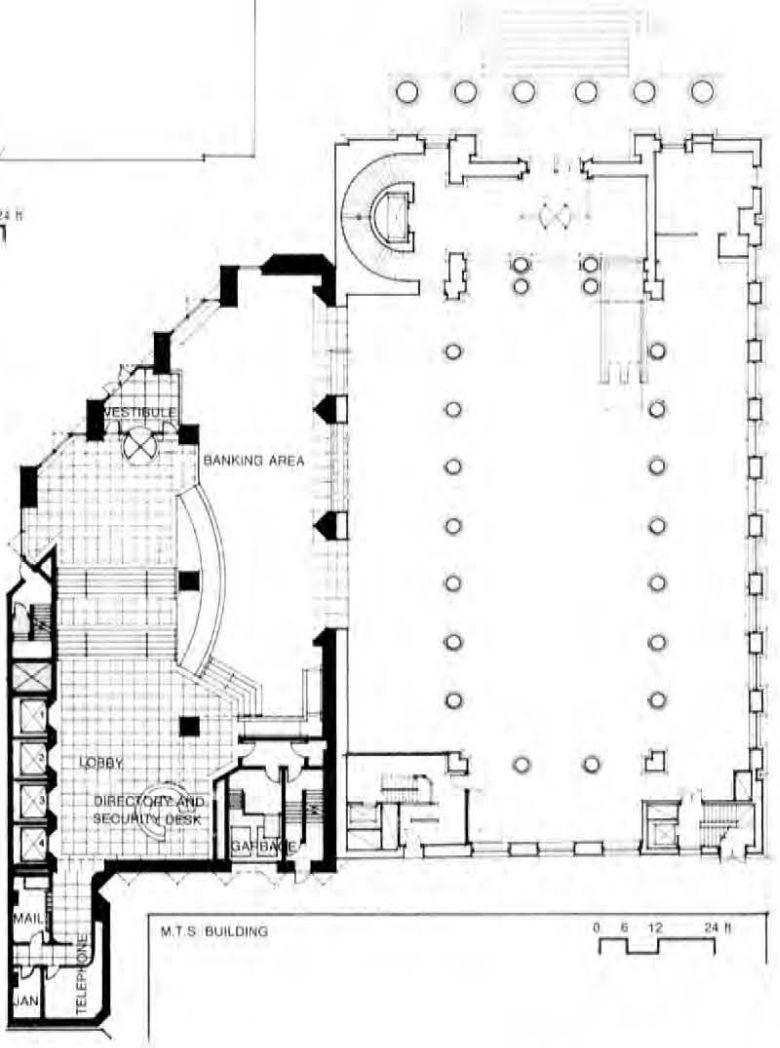
The Legislative Building stands beside the Assiniboine River in beautifully maintained grounds which also contain the residence of the Lieutenant Governor. The proximity of the Bank of Montreal Building to the seat of government is an important convenience worth consideration.

Cross section



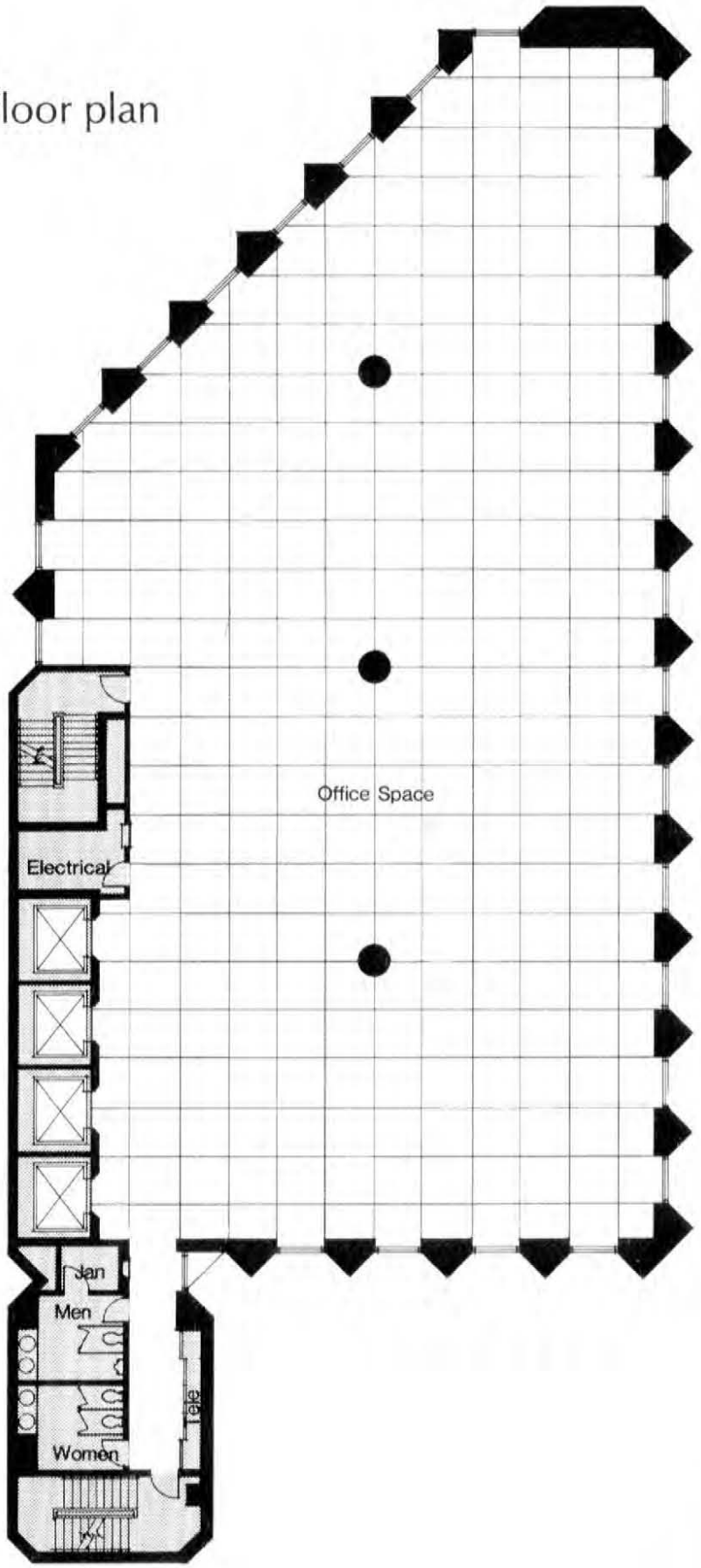


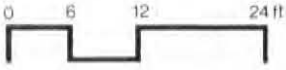
Concourse plan



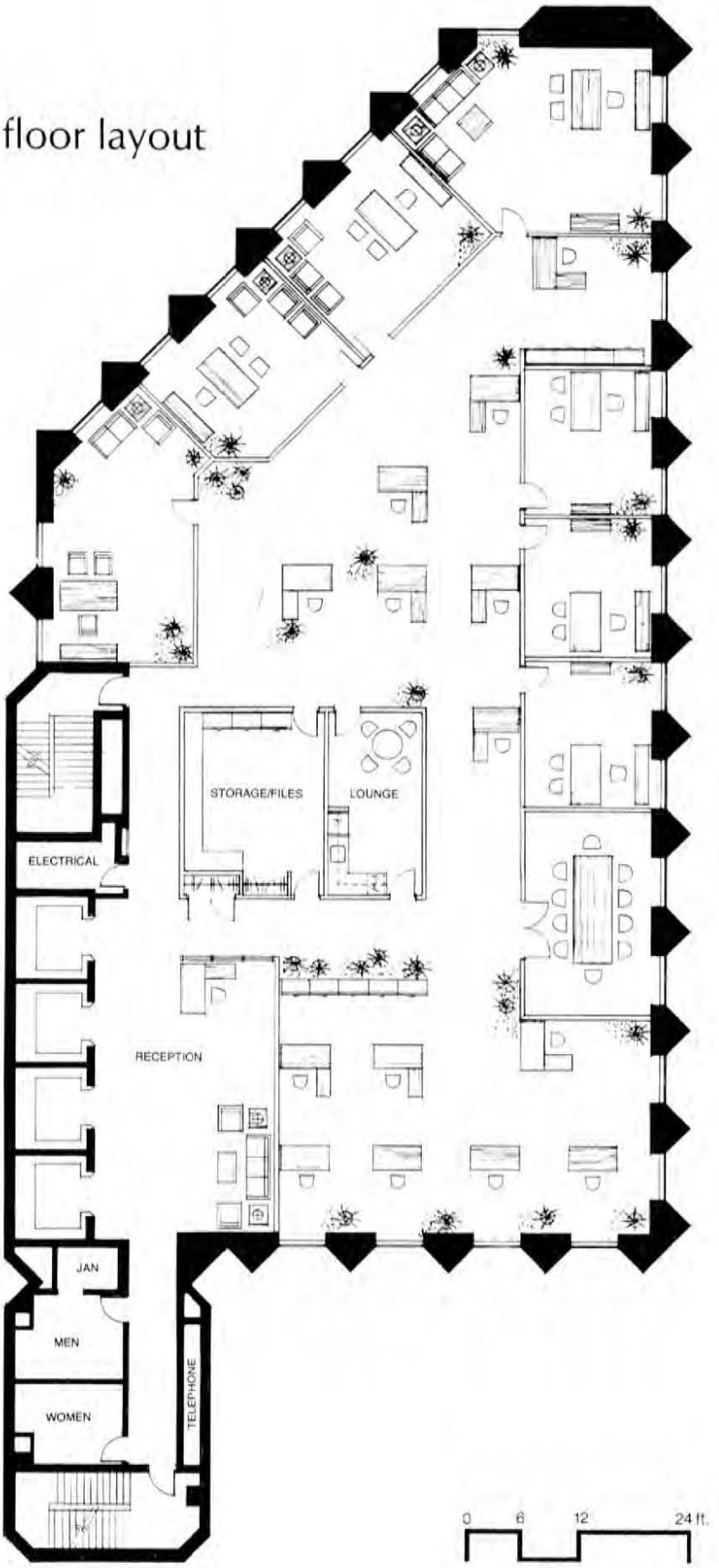
Ground floor plan

Typical floor plan





Possible floor layout



Winnipeg Welcomes You

Canada's sixth largest city combines bustling business activity with many social amenities to make "the good life" a reality in this gateway to western Canada.

Situated in the centre of North America, Winnipeg has a wide choice of rail, truck and air transportation facilities for access to raw materials and the markets of the entire continent.

As the provincial capital, Winnipeg is the site of many provincial and federal offices which permit easy access and consultation.

Life is pleasant in Winnipeg, too. The dry and sunny climate fosters participation in sports and outdoor activity, whether on its several golf courses, at the many lakes within a short drive of the city or as a spectator enjoying football and hockey at the professional level. Fine educational facilities are provided by two universities, a community college and private business schools.

Culturally, Winnipeg is the home of the Royal Winnipeg Ballet together with theatre, opera and symphony organizations, an outstanding art gallery and planetarium.

Winnipeg offers a warm, hospitable welcome to a future of progressive growth and personal pleasure.

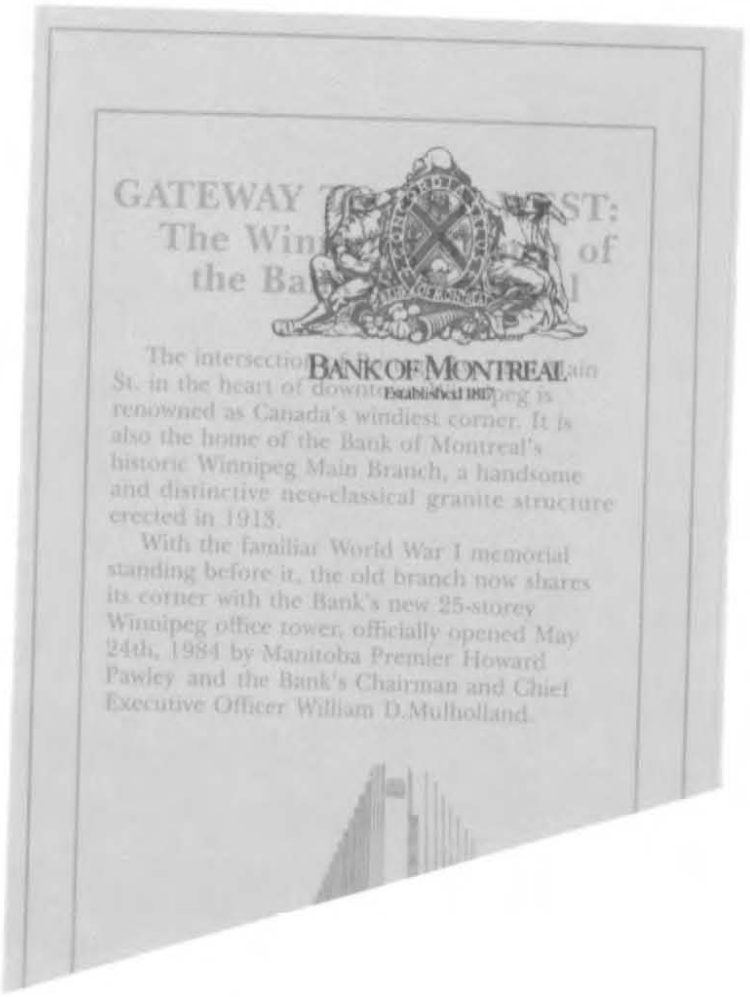
There is plenty of cultural activity in Winnipeg. Theatre is year-round through the summertime outdoor "Rainbow Stage" and the Manitoba Theatre Centre. Ballet, symphony, dance and opera performances lure culture lovers. The visual arts are enjoyed at Winnipeg Art Gallery and the Winnipeg Cinema Gallery of the University of Manitoba.

The open air market, held on summer weekends, is the focal point of the Old Market Square Heritage District.

Spectator or participant, Winnipeg has plenty of choice. Winnipeg's Blue Bombers of the CFL and the Jets in the NHL are prime entertainment in the field of pro sport. Curling and cross country skiing are widely enjoyed in winter, while a dozen golf courses, many tennis courts and several swimming pools beckon the summer sports enthusiast.

Winnipeg is a great place for family fun. Clear, crisp days invite outdoor activities in winter with the two rivers bordering the city providing wide open stretches for skating, as pictured above at Assiniboine Park.

University of Manitoba and the University of Winnipeg grant degrees in arts and sciences in modern, pleasant academic environments. Red River Community College graduates nearly 600 students each year in the field of business. Centennial Library (above) is a notable addition to the City's educational resources.



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APPENDIX B

Excerpts from the 1983 Whiteshell Master Plan.

APPENDIX B
Excerpts from the 1983 Whiteshell Master Plan.

2.3 Extensive Recreation Zones (Map 4)

The four Extensive Recreation Zones in Whiteshell Provincial Park cover 1,701 sq. km. or 62% of the park's total area. These zones are the Frances Lake Zone, the Malloy Lake Zone, the Cabin Lake Zone and the Winnipeg River Zone.

Generally, all recreational activities permitted in the Backcountry Zone are appropriate in Extensive Recreation Zones. Fishing and hunting are permitted with the exception of some specific restrictions for hunting in the Frances Lake Zone and in the Malloy Lake Zone (in the area south of the C.N.R. line up to the east shore of the Whiteshell River). The hunting of geese is not permitted in these areas to ensure greater protection of Canada Geese frequenting the Alf Hole Goose Sanctuary.

Generally, forestry and mining operations are permitted in Extensive Recreation Zones and all-weather roads may be developed in support of these activities. Any such operation will, however, be subject to terms and conditions of permits to explore, harvest or develop.

Trapping in Extensive Zones will be permitted to continue under prevailing management and regulation. Wild-rice harvesting will also be permitted to continue.

v. Tie Creek Visitor Centre

Themes: (1) Native life-styles, world perspective, religion and values.
(2) Problem-solving across cultures.

The Tie Creek petroforms in the northern area of Whiteshell are an internationally significant cultural resource. Preservation of the petroforms is of paramount importance and continuing research is essential to provide detailed inventory and recording of the site. Prior to development a detailed plan will be prepared in consultation with elders in the native community, researchers, archaeologists nd anthropologists.

The concept envisaged for the centre differs from the more traditional approach to interpreting native life-style. It may be possible to use more sophisticated technology, films, drama and role-playing events to deal with the world-view and life-style of these first peoples of Manitoba. By gaining an understanding of his daily aspirations, his values and attitudes towards his family, his concept of time, his ownership of goods and the regulating mechanisms of his social system, the visitor to the centre will benefit from a much greater appreciation of the native's culture. A self-guided trail will give the visitor an opportunity to experience and apply some of these concepts.

A Community Presence

In all its redevelopment and expansion plans, the Bank strives to harmonize efficient and cost effective modern buildings with existing architecture nearby. Buildings of particular historic note, such as the former Molson Bank Building at St. Peter and St. James Streets in Montreal, have been refurbished to keep much of their original character and charm, while still serving as efficient and economical office locations.

The Bank of Montreal believes in the importance of a strong presence in Canadian communities. This presence is most noticeable, of course, in the Bank's operations. Yet our buildings are also important, if less remarked upon, symbols of our commitment to Canada's towns and cities. We intend to place continued attention upon their efficiency, quality and appearance for the benefit of all who visit or work in them. The Bank of Montreal Main Branch and tower at Portage and Main exemplifies that policy.

Bank of Montreal

GATEWAY TO THE WEST: The Winnipeg Branch of the Bank of Montreal

The intersection of Portage Ave. and Main St. in the heart of downtown Winnipeg is renowned as Canada's windiest corner. It is also the home of the Bank of Montreal's historic Winnipeg Main Branch, a handsome and distinctive neo-classical granite structure erected in 1913.

With the familiar World War I memorial standing before it, the old branch now shares its corner with the Bank's new 25-storey Winnipeg office tower, officially opened May 24th, 1984 by Manitoba Premier Howard Pawley and the Bank's Chairman and Chief Executive Officer William D.Mulholland.

by natural light throughout, create an atmosphere of warmth and ease.

Since its construction in 1913, the building at Portage and Main has needed very little major maintenance work due to the strength and quality of the original design. Renovations conducted in 1953 included the conversion of third floor living quarters into offices, and the installation of larger front windows and air-conditioning. During a large-scale restoration project begun in 1975, the exterior walls were cleaned, a new copper roof installed, all marble surfaces refurbished and carpeting, modern heating, lighting and electrical systems introduced.

The Tower

Construction of the new tower began in the spring of 1982 and the first tenants moved in by the end of 1983. The $25 million building houses 200,000 square feet of office space, is highly energy-efficient and utilizes the most modern safety systems available. It is designed as well to provide full access for the disabled.

The elevator system is worthy of note. Since the elevators are positioned against one side of the building rather than in a central core, each floor has completely open space. The elevator booths themselves come equipped with full security systems, controls within reach of the handicapped, and an information screen.

The tower is connected to the Main Branch at three levels. Principal access is through the tower's ground floor lobby which opens into the old branch's main banking hall. There are also glass doors at mezzanine level, as well as a connection through the Portage and Main underground concourse.

Statue of Patria

In the triangular plaza adjoining the front steps of the branch, the massive, nine-foot bronze statue of a Canadian soldier in World War I battle dress stands guard. When the Bank of Montreal decided to erect a memorial to the 230 members of its staff who had

fallen in the Great War, it arranged an international design competition. The winner, noted American sculptor James Earle Fraser, submitted two designs, both of which were accepted. One was for an allegorical figure of Victory and was subsequently executed in marble; it stands in the atrium of the Montreal Main Branch. The bronze soldier, modelled after Captain Wynn Bagnall, a Winnipeg Branch staff-member who had served through the war and had been awarded the Military Cross, was erected on December 5, 1923. In the following year, Fraser received for this sculpture the gold medal of honour at the New York Exhibition of Architecture and Allied Arts. The grim, determined visage borne by the statue typifies the spirit of the Canadian Expeditionary Force and serves as mute testimony to their unstinting sacrifices.

The 317-foot tower now serves as management headquarters for operations throughout Manitoba and Ontario west from Thunder Bay. It is an example of how a new building can be skillfully designed to complement, aesthetically and practically, a traditional bank branch, keeping it useful while preserving it as an asset of the national heritage.

Joining the neoclassical grandeur of the branch to the ultramodern simplicity of the tower was a challenging task, and was successfully executed by Winnipeg contractors and specialists overseen by the architectural firm of Smith Carter Partners. The tower, of white polished granite, offers a contemporary interpretation of classical architectural values — slenderness and clean lines — yet it is a model of economy and efficiency.

The Site

When Henry McKenney decided in 1862 to build a general store at the crossroads of two trails, the site he chose was a source of amusement to settlers at Upper Fort Garry. It was not only too far from the river, but it also in springtime turned into a noisome swamp. But McKenney persisted, and his general store, located at the present-day corner of Portage and Main, became the nucleus for the future city of Winnipeg. Manitoba's transition in 1870 from the Red River Colony, tightly controlled by the Hudson's Bay Company, to a full-fledged province in the Dominion of Canada presaged a rapid era of growth for Winnipeg. With discharged soldiers from Fort Garry settling on farms nearby, the local fur-traders quickly expanded their business to include agricultural implements, lumber, merchandise and land. Thus Winnipeg merchants became the chief suppliers of goods to the waves of settlers who came to farm Manitoba's open prairies.

The sale of land also provided a major stimulus to economic growth: by 1880 the city was home to 59 financial and real estate interests. Winnipeg's confident and aggressive entrepreneurs always believed that their city would be the Canadian West's central metropolis, and it was this unshakeable belief that attracted new immigrants and new investment to the region.

Such "boosterism" was a valuable commodity considering the physical setting of early Winnipeg. Described by a resident as a "muddy, generally disreputable village" of about 1,500 people, the settlement had no waterworks, sewage, sidewalk, pavement or streetlights. Pedestrians attempting to cross the street often had to negotiate a perilous sea of mud. The Red River carts plying this sea adopted a peculiar wide echelon pattern to avoid the deep ruts of the cart ahead; thus, both Main and Portage were allotted 132-foot right-of-ways to accomodate this traffic. The wide-open space thereby created at the junction of these two thoroughfares became a focal point of important historical events, such as the Winnipeg Riot of 1919.

The Bank

Founded in 1817, Bank of Montreal was the first bank in Canada. It has participated in many projects furthering Canadian development, including the first canals, railway and telegraph, construction of the trans-continental Canadian Pacific Railway, major hydro-electric projects, and the development of the energy and mining industries. From the beginning, the Bank issued bank notes and continued to do so until the Bank of Canada, the central bank founded in 1935, took over this role. Today, Bank of Montreal is a leading world bank, with over 1,200 branches across Canada and offices around the globe.

In 1877, anticipating the railroad construction, the Bank took an important step in its westward expansion when it established its Winnipeg branch, the first branch west of the Great Lakes. First premises were on the southwest corner of Main Street and Broadway in a building owned by the Hudson's Bay Company. The Bank's safe had not yet arrived from Montreal; rather than postpone the opening, the manager, Campbell Sweeny, carried all the Bank's cash in his pockets. The Bank moved in 1881 into a handsome brick building at the southeast corner of Portage and Main. Forced out by a fire in 1882, the branch and its co-tenant, the Canadian Pacific Railway, shared lodgings in an abandoned Presbyterian church until the building was rebuilt.

The city's rapid growth rate – 130,000 people by 1910 – soon necessitated more substantial quarters for the Bank; construction of the new branch began in 1911 and was completed two years later.

The Main Branch

Building plans for the Main Branch generated much excitement amongst Winnipeg's citizenry, who looked forward to a structure of monumental proportions and classic beauty to dominate the triangular site at the intersection. Selection of the renowned architectural firm McKim, Mead and White, which had completed some years earlier a massive renovation of the Montreal Main Branch, virtually ensured such a result. Known for their design of elegant private residences and monumental public buildings, McKim, Mead and White's works also include the Boston Public Library, Columbia University, the Pennsylvania Station in New York City and the Minneapolis Institute of Arts.

The portico of Winnipeg Main Branch consists of six unfluted Corinthian columns rising fifty feet above street level. Resting atop this colonnade is a massive entablature inscribed with the words "Bank of Montreal", and above this, a parapet inscribed in smaller letters "Bank of Montreal; Founded 1817; Incorporated by Act of Parliament, Established in Winnipeg 1877; This Building Erected 1913." The temple effect is further enhanced by large pilasters along the building's side facing Portage Avenue and rear. Aside from the inscriptions above the portico, the exterior columns, pilasters and walls are virtually unadorned in order to maintain the edifice's neo-classical simplicity and dignity.

Through the massive main entrance with its impressive architrave, the visitor enters a large vestibule with four Ionic columns. To the left is the manager's office, replete with vaulted plaster ceiling and 100-year old chandelier. Three marble stairs lead up into the main banking hall.

The first impression is of tremendous height: the richly detailed, coffered ceiling, decorated in gold leaf estimated in 1980 to be worth $1 million, towers 50 feet, 4 inches above the main banking floor. A mezzanine encircles the hall and is supported by 20 Ionic columns. A second colonnade links the mezzanine to the ceiling. In order to provide a feeling of immense space while maintaining a warm and cheerful atmosphere, the interior columns and side walls are covered with light buff Botticino marble imported from northern Italy. The building is well situated to take advantage of daylight; the long facade facing Portage Avenue is amply supplied with windows set between the exterior pilasters. The rear wall has four stained glass windows at floor level that are illuminated by artificial backlighting; three of them bear the coats of arms of Canada, Manitoba and the Bank of Montreal.

Main Banking Hall.

The overall impression of grandeur is reinforced by black quarter-cut oak walls, marble-faced fireplaces and velvet curtains. The works of such well-known prairie artists as Clarence Tillenius and Albert Hochbaum adorn the offices of the mezzanine. Artificial light is provided by intricate antique fixtures, some of which were taken from the old Toronto Main Branch, as well as by modern lighting. An unusual horseshoe-shaped marble counter extends across the main hall, over which customers and tellers conduct their business. In all, Winnipeg Main Branch may appear somewhat stately and austere from the outside, but the neutral tone of the marble suffused