

Frederickson • Cooper



City of Winnipeg Field Management
Services
Feasibility Study

September 24, 2001

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Introduction

The intent of this analysis was to determine the methods and costs to renovate the two City of Winnipeg Fleet Shops buildings, (821 Elgin-195 Tecumseh, 215 Tecumseh), up to a standard approximately equivalent to a comparable new facility, and to compare this cost against that for a new building.

The basis for the retrofit concept was the following:

- Upgrade of system performance to current standards. Systems include: Architectural, Building Envelope, Structural, Mechanical and Electrical.
- Program Addition
 - Relocate Administration Offices from Pacific Avenue
 - Add new Machine Shop
 - Add new Canopy by Plate Shop
 - Upgrade Maintenance Offices
 - Enlarge Locker Area
 - Others
 - Site Work

Summary

In determining building budgets, it was assumed that the program area for a new facility could be reduced by 3%, relative to the renovated facility, to account for more efficient space planning and layout. Site development was confined to the asphaltting of the east yard behind the machine shop for the renovation option. Site development for the new option was addressed, essentially, as a percentage of the building budget.

The resulting budgets are as follows:

- **Renovation Option:** \$5,789,029
- **New Option:** \$9,887,563

The renovation option is approximately 60% of the new.

These budgets do not include GST, furniture, furnishings & equipment

1.0 Architectural

1.1 Building Envelope

Roofing

Roofing typically consists of a 4-ply built-up membrane, R10-R14 insulation and mopped-on vapour barrier. The parapets are masonry with metal coping flashing and are uninsulated. The roof membrane is carried up the cant and adhered to the inside face of the parapet masonry, short of the coping. There are leaks in some areas, usually near the roof edge.

The roofing membrane is improperly joined to the parapet. At the least, it should be regulated into the masonry to reduce water penetration. More properly, the insulation and membrane should carry up the face of the parapet and over the top, under the coping flashing. This would properly seal the roof-wall junction and keep a significant amount of water out of the wall. If the wall were to be retrofitted, then the Air / Vapour Barrier should also be carried over the parapet and tied into the wall Air / Vapour Barrier.

The main roof area is generally in acceptable condition, however, it lacks adequate drainage slope and adequate number of rain water leaders. It is also somewhat deficient in insulation levels.

Given the above deficiencies, the retrofit design will include replacement of the existing roofing complete with additional rain water leaders as necessary, sloped EPS insulation to create drainage planes, insulation to energy code (extruded polystyrene) levels and properly integrated parapet details as described above.

Walls

The walls are typically 12" (nominal) non-load-bearing masonry, either (3) wythes of clay brick or (1) wythe of concrete block with (1) wythe of 4" face brick. There is some mortar joint deterioration on the upper elevations which has been caused by water penetration of the parapet due to interstitial condensation and poor roofing detail. However, this deterioration has not progressed to the point when the masonry must be re-built. Re-pointing of the affected areas will be sufficient if the wall is to be retrofitted.

The walls are unclad and unfinished and, therefore, contain no Air / Vapour Barrier or insulation. Water shedding capability is by evaporation and, as previously mentioned, there is an insufficient tie-in to the roofing.

Because of the need for long-term durability, energy efficiency, comfort performance and interior appearance and light reflectance, the retrofit design will include a new Air / Vapour Barrier (either interior acrylic or exterior membrane), new (poly-isocyanurate) insulation and metal cladding system employing thermally-broken hangers.

Windows / Glass Block

The existing windows vary in their frame and glazing types. Hermetically-sealed double-glazing is predominant. Frames are either non-thermally-broken aluminum or wood. The glass block is standard translucent type set in metal bucks.

The thermal and air leakage performance of the windows is very poor primarily due to the poor glazing-to-frame and frame-to-wall detailing. It would also be necessary to remove and reinstall the units in the event of a wall retrofit to enable flashing installation, Air / Vapour Barrier connections and placement of the units in the correct thermal plane. The glass block has similar deficiencies (although somewhat superior in air leakage resistance).

Given the above deficiencies, the retrofit design will include replacement of all window and glass block units with new thermally-broken, aluminum framed units with dual, 'low-e' glazing. In some situations, the area of glazing could, and would, be increased to allow for increased natural light. (This would apply, for example, to the old machine shop and the new mezzanine conference area).

Man-doors

The retrofit design will include new insulated steel doors and frames.

Overhead Doors

Many of the existing overhead doors are in poor condition or are deficient in energy performance, (seals, insulation), or operating mechanism.

The retrofit design will include replacement of all (functioning) overhead doors except those recently replaced, and additional doors as required by program (machine shop area).

Floor Slabs

The existing floor slabs are in generally poor condition and typically have inadequate slope-to-drain. They would require scarification and the addition of a topping slab thick enough to accommodate this slope and to accommodate in-floor-radiant heating. Resulting higher floor elevations would create access problems.

Given that the original concrete and reinforcing is sub-standard, (see structural), and that substantial work is necessary to bring the existing up to performance levels, the retrofit design will include demolition of most of the existing slabs and replacement with new.

1.2 MBC Code Conformance

The retrofit design will require upgrades to provide conformance with the Manitoba Building Code, (1998), in the following categories:

- Sprinklering: All buildings must be sprinklered
- Fire Separations: The floor structures and supporting elements for the Mezzanine and Second Floor (Building 'B', 821 Elgin), must be fire-rated to 1-hour
- Exiting: [To be verified].
- Handicapped Accessibility: New offices in building 'B' must be barrier-free. This will entail the installation of a lift or elevator to the Mezzanine and Second Floor.

1.3 Space Planning

New Offices

New administrative offices, (relocated from Pacific Avenue), will be accommodated in Building 'B' in the old signals area. Because of the necessity of leaving some of the signals equipment in place, and because of the need to expand the locker area, it will be necessary to utilize the second floor area and mezzanine to provide adequate space.

As mentioned in 1.2, the upper levels will require barrier-free access, either a lift or elevator. Given the anticipated intensity of use, the 3-stop requirement and the historical maintenance

problems with lifts, the retrofit design will include a small hydraulic elevator. (a code-stipulated stretcher-sized unit can be avoided).

The offices would be organized as per the user-group needs. They would be finished to normal office standard complete with glued-down nylon carpet, carpet base, drywall & paint, acoustic tile ceilings, hollow-metal doors and frames, energy efficient lighting, standard power and systems and a communications conduit system. Natural light will be included.

Existing Maintenance Offices

This area, including the lunchroom, would be outfitted with new flooring, wall paint and new acoustic tile ceilings – a general décor upgrade. Hardware would also be changed to match and coordinate with that being provided with the new doors.

Machine Shop Addition

The machine shop addition, immediately to the east of the existing, would be a single-story, clear-span steel structure with metal cladding and 2-ply roofing. The building envelope would be designed to MBC Part 5 performance standards and to Energy Code insulation levels.

The inside face of the outside wall would be finished with a pre-finished metal liner. There would be extensive natural light and good high-bay lighting. There would be in-floor-radiant heating. A 3-ton crawling crane would be included.

1.0 Structural

This is to confirm visual walk through inspection of these buildings on September 4, 2001 with regard to their structural condition in connection with proposed upgrading and renovations. The following are my comments:

1.2 TRAFFIC SIGNALS BUILDING - 821 ELGIN AVENUE

This building has a two storey office / shop section at the southwest corner which is of exposed steel beam and column framing with concrete floor slabs. It is of substantial construction with greater load capacity than is required for office use. Foundation and framing are in sound structural condition with no evidence of distress or movements.

The single storey rear shop is clear spanned with deep steel trusses at approximately 20 foot centres and open web steel joists between, covered with metal roof decking. This area is also in sound structural condition. Clear height to underside of trusses is only 11 feet.

Exterior walls are solid 3 wythe clay brick infill between steel columns. These are not insulated. These are in good condition except for the parapet section at the 2 storey portion which has deteriorated mortar joints and is in need of considerable repointing.

1. A steel framed mezzanine has been added.
2. Overhead doors are older standard wood panels and in fair condition.
3. Ground floor is a concrete slab on grade. This is in reasonably good condition however the shop area has little if any slopes to the trench drains.

1.3 TIRE SHOP

1. This appears to be an infill building between the original traffic signals building and equipment repair shop. This single storey area is clear spanned with steel girders and steel joists in between covered with metal decking.
2. Walls are 12" masonry (8" block and 4" brick) infill between steel columns, copings are in need of some repairs.
3. Superstructure is in sound condition. Foundation conditions also appear to be sound.

1.4 EQUIPMENT REPAIR SHOP - 195 TECUMSEH

1. This single storey shop is also clear span steel roof with 10 bays of steel girders and steel channel purlins. This superstructure appears to be substantial and is in sound condition.
2. The exterior walls are of brick infill construction between steel columns.
3. There are two continuous strips of glass block windows.
4. There is a 5 Ton older bridge crane with the crane bay extending full depth of the shop. There is approximately 16 feet of working headroom under the crane.

5. The heavy horizontal cross bracing at the roof level does not appear to be picked up at each end wall with any vertical bracing.
6. Ground floor slab on grade is in generally poor condition with areas of deterioration, prior repairs and cracking. There are also minimal floor slopes.

1.5 MACHINE SHOP – 215 TECUMSEH

1. This building is framed similar to the equipment shop but with somewhat greater headroom. This superstructure is in sound condition.
2. Exterior walls are 12" brick infill between steel columns. These are in good condition.
3. There are several lower roof annex areas to this building currently used as a lunch room and carpentry shop. It was noted that these floors are one step higher than the main building.
4. There are 3 lines of glass block windows.
5. There is also an older 5 Ton bridge crane in this building.

SUMMARY

Generally, these buildings were found to be in sound structural condition with no evidence of any significant distress or movements. Exterior brick walls are generally in very good condition with several areas in need of local repairs. It would in our opinion certainly be structurally feasible to upgrade or add to these buildings with these structures anticipated to continue to provide satisfactory performance.

The ground floor concrete slabs on the other hand are generally in fair to poor condition. These were built with little slope for drainage that is typically required for vehicle shops with a lower quality surface finish. Removal and replacement with a high quality industrial concrete floor is recommended for all of the ground floor slab on grade areas.

These floors are independent of the rest of the buildings and could readily be removed and replaced at an estimated cost of \$15 per square foot. Alternatively, it may be feasible to scarify the surfaces and re-surface these slabs with a high quality topping from 8" to 2" thick in order to provide slopes for drainage to new trenches.

The cost of this work would be in the order of \$10 to \$12 per square foot depending on the depth of scour required as many areas have a degree of oil penetration that would impede bonding of a new topping. Since repair cost would approach $\frac{3}{4}$ of replacement cost, this approach may not be cost effective. As far as additions are concerned, these would be feasible and should be designed as independently supported structures.

3.0 MECHANICAL

3.1 BUILDING A – 215 TECUMSEH

UTILITY SERVICING

There are two domestic water services to the building, one sanitary and one natural gas. The gas services are suitable for reuse in a renovation. The sanitary sewer has collapsed in several areas and should be completely replaced with PVC solvent weld pipe. A new 150 mm fire protection main is required to the building to service a new sprinkler system. When the fire main is installed, a new 50 mm domestic water meter must be installed in the same trench.

The proposed new Machine Shop will interfere with an existing catch basin, which must be relocated.

FIRE PROTECTION

The building is not sprinklered for fire protection, nor are there any fire hose standpipes. Fire protection consists of hand held multipurpose extinguishers. A repair facility of this nature requires a fully sprinklered building.

PLUMBING

The existing plumbing fixtures are serviceable, but are aged and likely could not be relocated easily. All the fixtures should be replaced. The new plumbing fixtures must include barrier free models for handicapped access. Consideration should be given to installing new showers for general use. A new emergency shower/eyewash combination unit is required in the Repair and Manufacturing Shop, complete with a mixing valve for tempered water.

The shop areas require open slot drains throughout. The drains must be easily cleared of the inevitable debris that will accumulate. All shop drains must be connected to a mud/oil interceptor (one per shop).

Wash down hose bibs should be installed for general use throughout all the shop areas.

The compressed air system should be replaced in its entirety. Comfort conditions could be vastly improved by relocating the compressors into a ventilated, acoustically insulated room. The new receiver must be significantly larger than the existing unit. New quick connect fittings must be compatible with the existing equipment.

A new breathing air supply must be provided for each of the paint rooms. Rather than provide dedicated high quality oil free compressors, a tail end air purification system should be installed outside each paint room, connected to the new compressed air system.

The acetylene and oxygen distribution systems must be replaced with complete new piping to the Dept. of Labour Standards. The bottle storage and manifold systems could be reused. All new quick connects must be provided.

HEATING

The existing condensate piping is failing, and has already been repaired numerous times. The frequency of leaks will only continue to increase. Any renovation will need to replace all the heating water return piping in its entirety. The steam piping is quite old and may possibly be serviceable for

a renovation. Typically piping of this age is very difficult to thread and connect to, consequently the cost estimates allow for replacement.

The average life expectancy of a boiler is thirty years, these units are already well beyond this age, and cannot be depended on for the long term. The replacement boilers should be high efficiency hot water type, as steam boilers are not widely used for heating any longer.

The existing unit heaters are old, extremely dirty and only suitable for use with steam heating systems. We recommend repair and shop facilities utilize radiant floor heating systems to reduce maintenance. Unit heaters tend to require frequent maintenance and experience reduced service lives due to the dust.

The ventilation requirement of the Repair and Manufacturing Facility is very high, consequently, to heat the outdoor air up to an appropriate level for supplying to the space, a glycol heating loop should be installed. This will provide freeze protection and can be heated by the main boiler system.

VENTILATION

The existing ventilation system consists of a supply fan and four Reznor duct heaters. The system statistically has a service life of fifteen years. The current system was installed in 1978 and has already exceeded its life expectancy. At present there are serious backdrafting problems due to the system being undersized and the building being under a negative pressure. In addition, the existing welding and vehicle exhaust system does not meet current requirements and will be increased in size. The current system should be replaced entirely with new larger systems. We recommend that two air replacement units be provided for the Machine Shop Area, one interlocked to a new tailpipe/welding exhaust extraction system, and the other for general air quality. The make up air unit that replaces air for the tailpipe/welding exhaust should be a modulating high efficiency indirect fired unit.

The general make up air system should be a heat recovery ventilator to save energy. There will be some additional maintenance replacing exhaust air filters, but the savings should be approximately sixty percent of the cost of operating a standard make up air unit.

The vehicle and welding exhaust system does not remove sufficient air, and there are not enough inlets for the space and the operating requirements. This system must be upgraded completely. The cost estimates include for ten welding fume extraction arms and three vehicle exhausts with automatic disconnects.

The existing shop floor mounted paint booth does not meet current codes and must be upgraded and the existing fan replaced with an explosion proof model.

The dust collection system in the Wood Shop is new and should be reused in any renovation or building replacement.

The existing paint rooms and paint prep area are required to be ventilated with special, dedicated systems. The air must be supplied at a velocity that is great enough to remove solvents and aerosols, but slow enough that the paint stream is not deflected.

Typically the air is supplied at one end of the room through inlet filters (that ensure an even and laminar airflow) and exhausted at the other end, also through filters. All components serving these rooms must be explosion proof and they are very expensive. Each room should be ventilated independently so that an equipment failure will not interrupt painting operations.

Several large areas such as the Lunchroom and the Tool Crib are not ventilated at all and do not meet the requirements of ASHRAE 62 'Standard for Ventilation for Acceptable Indoor Air Quality'.

AIR CONDITIONING

The office spaces are the only air-conditioned spaces in the building. Each office is equipped with a residential style window cooling unit. These tend to be noisy and create drafts in office environments and will be replaced by a central heat/cool/ventilate rooftop unit.

No other space will be air-conditioned.

CONTROLS

The building control system should be upgraded to a basic DDC system compatible with the Johnson Control System currently used in City Buildings.

3.2 BUILDING B – 195 TECUMSEH

UTILITY SERVICING

The building is serviced with domestic water, sanitary and natural gas. The gas service is suitable for reuse in a renovation. The sanitary sewer has collapsed in several areas and should be completely replaced with PVC solvent weld pipe. A new 150 mm fire protection main is required to the building to service a new sprinkler system. When the fire main is installed, a new 50 mm domestic water meter must be installed in the same trench.

FIRE PROTECTION

The building is not sprinklered for fire protection, nor are there any fire hose standpipes. Fire protection consists of hand held multi purpose extinguishers.

A repair facility of this nature requires a fully sprinklered building, and these must be provided in any renovation or new construction.

PLUMBING

The existing plumbing fixtures are serviceable, but are aged and likely could not be relocated easily. All the fixtures should be replaced. The new plumbing fixtures must include barrier free models for handicapped access. Consideration should be given to installing new showers for general use. A new emergency shower/eyewash combination unit is required in the Repair Shop, complete with a mixing valve for tempered water.

The shop areas require open slot drains throughout. The drains must be easily cleaned of the inevitable debris that will accumulate. All shop drains must be connected to a mud/oil interceptor (one per shop).

The existing high-pressure wash booth must be upgraded to handle more solids. A wider, deeper collection pit with a simplified sediment removal system is required. The wash system should include a high capacity hand wand as well as a fixed undercarriage wash. The existing system is maintenance intensive and must be replaced.

Wash down hose bibs should be installed for general use throughout all the shop areas.

The compressed air system should be replaced in its entirety. Comfort conditions could be vastly improved by relocating the compressors into a ventilated, acoustically insulated room. The new receiver must be significantly larger than the existing unit. New quick connect fittings must be compatible with the existing equipment.

The existing lubricant pumping systems should be reused in either a renovation or a new building. The distribution piping must be replaced.

HEATING

The existing heating system in the shop areas consists of gas-fired unit and radiant heaters. These units are quite new, and should last approximately ten years depending on the dirt and humidity in the air. These could be left in place in a renovation, but a better long-term solution would be to install a radiant floor heating system.

The cost estimates include a radiant floor, two high efficiency condensing boilers, pumps, and a heat exchanger for a glycol loop for ventilation.

The office areas are heated by an air-handling unit. These areas will need serious consideration as the floor to roof structure height is very low and not conducive to installing additional ductwork. The existing ductwork is unacceptably low.

VENTILATION

handling units. These systems statistically have a service life of fifteen years and are approaching the end. In the Repair Shop the make up air system is undersized for the duty. The existing ventilation systems should be replaced.

We recommend that air replacement units be provided for the Repair Shop, one interlocked to a new tailpipe exhaust extraction system, and the other for general air quality. The both make up air units should be heat recovery ventilators to save energy. There will be some additional maintenance replacing exhaust air filters, but the savings should be approximately sixty percent of the cost of operating a standard make up air unit.

The vehicle exhaust system does not remove sufficient air, and there are not enough inlets for the space and the operating requirements. This system must be upgraded completely.

The Traffic Signals Shops require additional ventilation air, and a heat recovery ventilator should be provided for each shop.

Several large areas such as the Parts Storage and Tool Crib are not ventilated at all and do not meet the requirements of ASHRAE 62 'Standard for Ventilation for Acceptable Indoor Air Quality'.

AIR CONDITIONING

The office spaces are currently air-conditioned and will be provided with a new rooftop heat/cool/ventilation unit.

No other spaces will be air-conditioned.

CONTROLS

The building control system should be upgraded to a basic DDC system compatible with the Johnson Control System currently used in City Buildings.

MECHANICAL BUDGET

BUILDING A – 18,330 SQUARE FEET

Site piping	\$ 40,000
Sprinklers	\$ 58,000
Fire extinguishers	\$ 2,000
Plumbing fixtures	\$ 34,000
Shop slot drains	\$ 46,000
Compressed air systems	\$ 47,000
Welding systems	\$ 18,000
Radiant floor heating system	\$146,000
Make up air systems	\$ 46,000
Exhaust air systems	\$ 37,000
Air handling units	\$ 14,000
Controls	\$ 42,000

TOTAL: \$ 530,000

BUILDING B – 31,705 SQUARE FEET

Site piping	\$ 37,000
Sprinklers	\$100,000
Fire extinguishers	\$ 4,000
Plumbing fixtures	\$ 54,000
Shop slot drains	\$ 77,000
Compressed air systems	\$ 41,000
Wash booth	\$ 26,000
Radiant floor heating system	\$229,000
Make up air systems	\$ 76,000
Exhaust air systems	\$ 36,000
Air handling units	\$ 34,000
Controls	\$ 51,000
	\$ 30,000

TOTAL: \$765,000

BUILDING C (ADDITION) 4000 SQUARE FEET

Machine Shop \$100,000

New building costs if under one roof, not two buildings, cost would be \$23.75 per square foot plus a cash allowance of \$60,000 for site utilities.

4.0 ELECTRICAL

4.1 BUILDING A – 215 TECUMSEH

SERVICING

Winnipeg Hydro services the building with an overhead line from the east with a dip to an interior vault.

M.T.S. services the building via an overhead service over the building from a pole line to the south.

DISTRIBUTION

Three (3) services are fed from the vault. The services appear to be two 800-ampere at 230V, 3 phase and one 600-ampere 120/240V, 1 phase service. This could not be confirmed, as the distributions have no marking.

The distribution must be replaced in its entirety to ensure reliability and flexibility. Replacement of equipment would not be available.

PANELS

Panels are located around the building, filled to capacity and in two areas subject to dust and deterioration.

New panels strategically located with proper capacity and spare must be provided.

POWER WIRING

Major portion of wiring is 60 years old. The wiring technique and new code provide a safer building. Proper grounding and flexible connection to equipment are two items.

LIGHTING

Main Shop Area lighting is illuminated with Metal Halide luminaires. The luminaires appear in good condition and levels are reasonable. Additional instant on luminaires are required to ensure a safe environment.

Lighting in other areas old and old technology which should be replaced for energy efficient luminaires.

EXIT LIGHTING/EMERGENCY LIGHTING

Minimal luminaires exist. The system does not meet present day codes and should be replaced.

SECURITY SYSTEM

System within complex operating satisfactory.

EXTERIOR ILLUMINATION

None existent

4.2 BUILDING B – 195 TECUMSEH

SERVICING

Power provided from two pole mounted Winnipeg Hydro transformers north of building with Triplex drops to service point on west end of building. Voltage drop and capacity of this service is a concern.

M.T.S. overhead service to building service point.

Fibre optics cable is mounted over the exterior of the building and subject to damage.

DISTRIBUTION

800-ampere, 230-volt, 3 phase ungrounded system and 800-ampere 120/240V, 1 phase system provided for building.

The service capacity for the building is minimal and will require replacement as the building is upgraded to present day codes.

PANELS

Panels are located around the building, filled to capacity and require upgrading and/or replacement to allow the building to be upgraded to present day standards.

POWER WIRING

Power wiring provided for minimal power in building, which requires extension cord usage in several areas.

A new power grid should be provided to ensure flexibility.

LIGHTING

Lighting in all areas is below standards and requires replacement to bring up to standards.

EXIT/EMERGENCY LIGHTING

Minimal is provided and requires upgrade to meet code.

ELECTRICAL BUDGET

BUILDING A – 18,330 SQUARE FEET

Winnipeg Hydro service	\$ 13,500
Distribution costs	\$ 73,000
Feeder/Panel costs	\$ 40,000
Lighting	\$ 60,000
Power/Receptacles	\$ 64,000
Emergency/Exit Lighting	\$ 16,000

Mechanical equipment wiring	\$ 18,000
Telephone/Data Wiring	\$ 15,000

TOTAL: **\$ 300,000**

BUILDING B – 31,705 SQUARE FEET

Winnipeg Hydro costs	\$ 9,500
Distribution	\$ 95,000
Feeder/Panel	\$ 50,000
Lighting	\$ 102,000
Power/Receptacles	\$ 76,000
Emergency/Exit Lighting	\$ 24,000
Mechanical Equipment	\$ 30,500
Telephone/Data Wiring	\$ 29,000

TOTAL: **\$ 416,000**

BUILDING C (ADDITION) 4000 SQUARE FEET

Machine Shop addition	\$ 60,000
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New building costs if under one roof, not two buildings, cost would be \$13.50 per square foot.

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Appendix A

Offices Space Program

City of Winnipeg Field Management Services Feasibility Study

	Space	Area	Comments
1	Reception & Waiting (4)	140	
2	Conference Room 8 to 12 People	220	
3	Kitchenette	50	
4	Payroll		
5	Computrol	160	4&5
6	Computer / Server		
7	Information Services (Former Garraway)	120	6&7
8	Work Station: (K. Saxton)	120	
9	Work Station: (W. G. Williams)	120	
10	Work Station: (Gary McCallum)	120	
11	Work Station: (Eugene Romaniuk)	120	
12	Work Station: (Peter Watt)	120	
13	Work Station: (Josie Fernandes)	120	
14	Work Station: Accountant	120	
15	Office: (Yvan Lupien)	175	
16	C.O.O. Secretary / General Clerical	100	
17	Area File Storage	200	
18	General Open Area (6 Stations)	500	
19	Mail, Copy, Statioary	120	
20	General Storage	100	
21	Files Room	0	See 17
22	Work Station: (S. M.)	120	
23	Work Státion: (E. Smith)	120	
24	Work Station: (E. S.)	120	
25	Work Station: (T. S.)	120	
26	Work Station: (H.B. / F. S.)	140	
27	Optional Exercise Room	300	

Total Net 4,120

Total Gross x 1.33 5,479.60

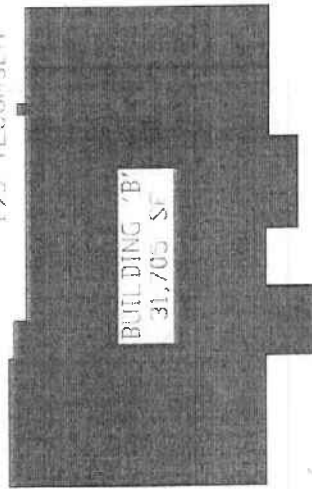
Appendix B

Offices Layout

Appendix C

Existing Building Plans & Elevations

195 TECUMSEH



BUILDING 'B'
31,705 SF

891 FLGIN

215 TECUMSEH



BUILDING 'A'
18,330 SF



NOT TO SCALE

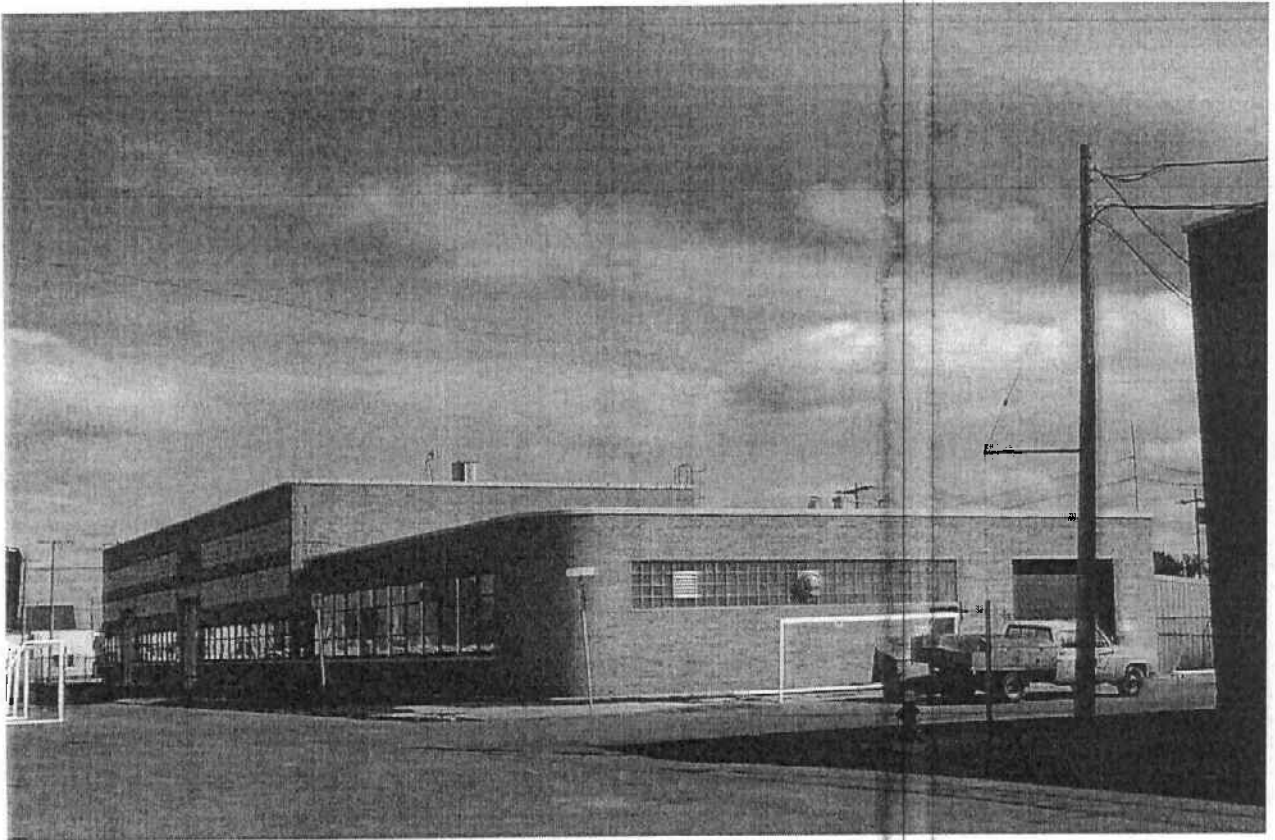


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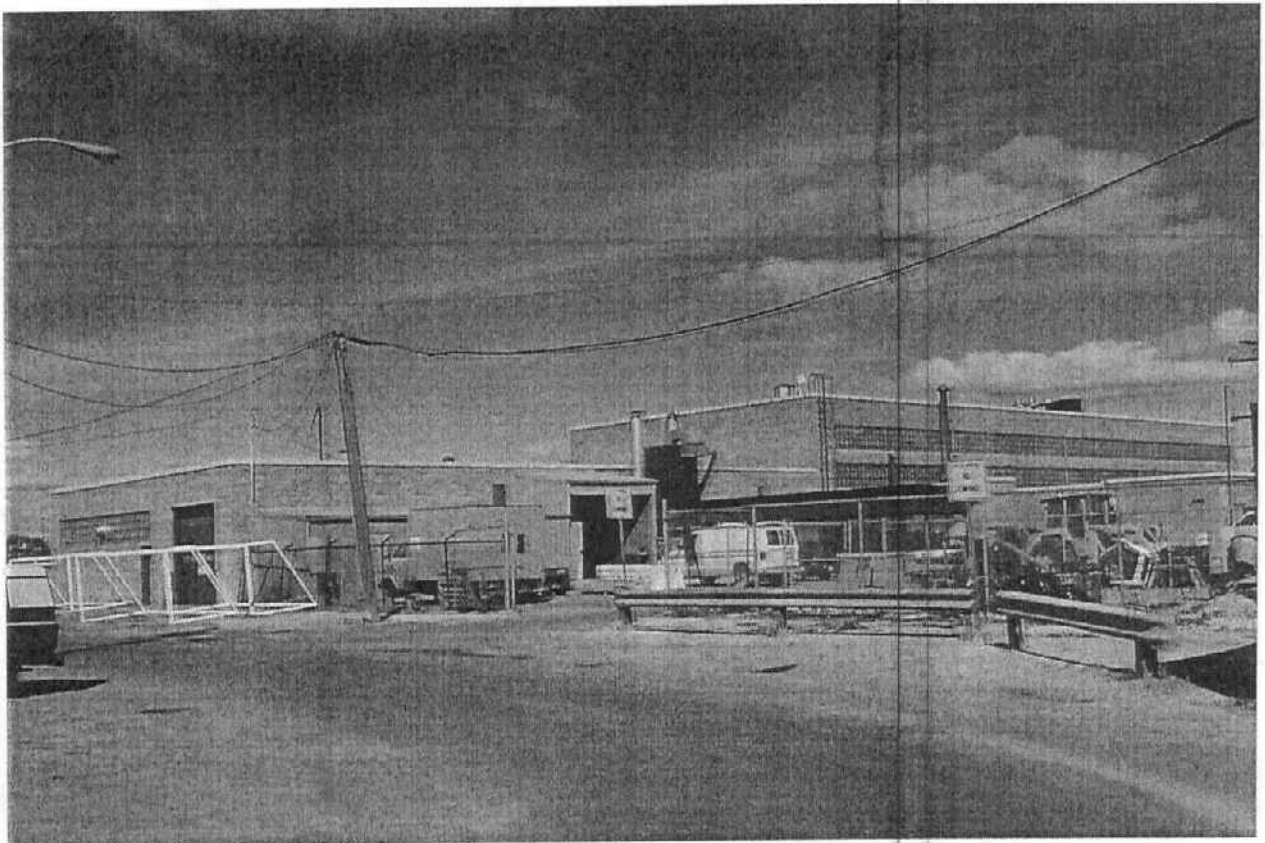


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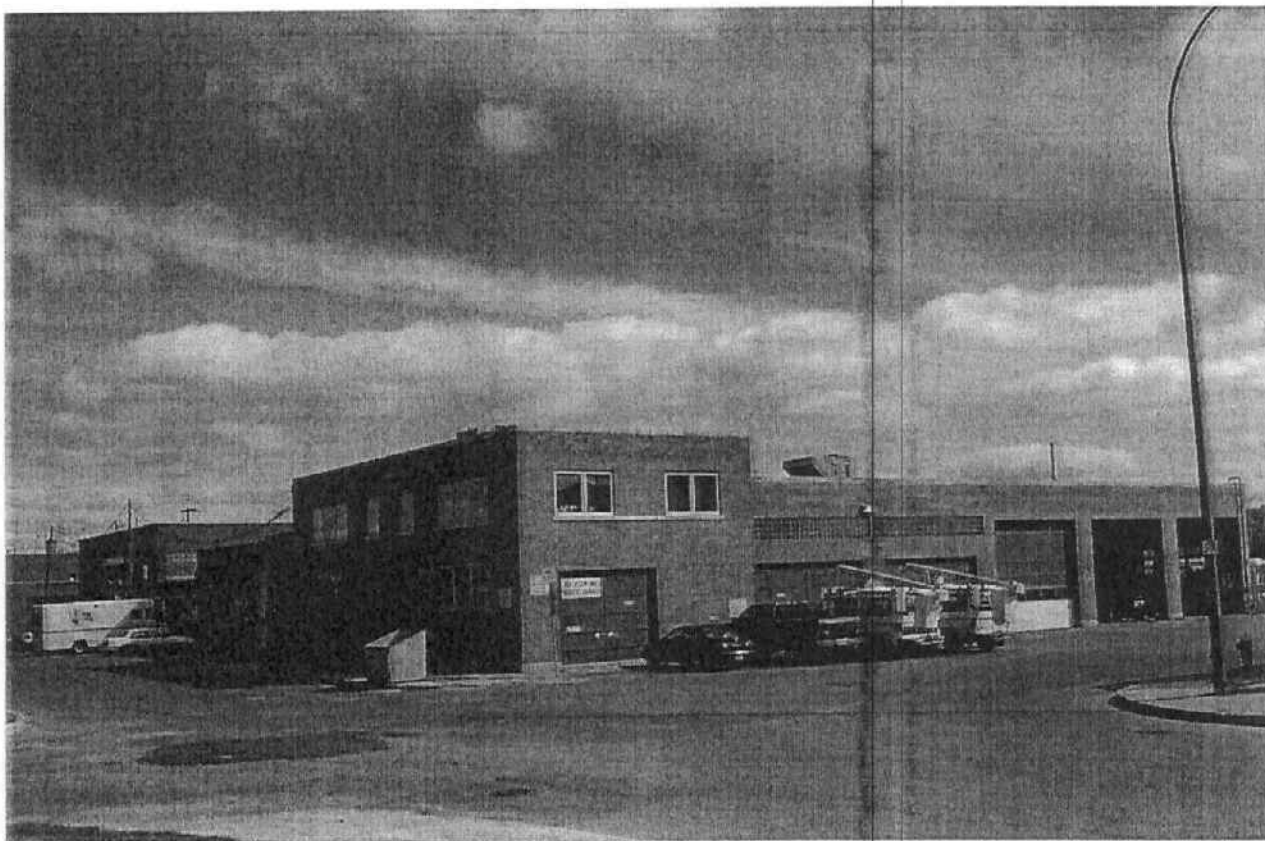


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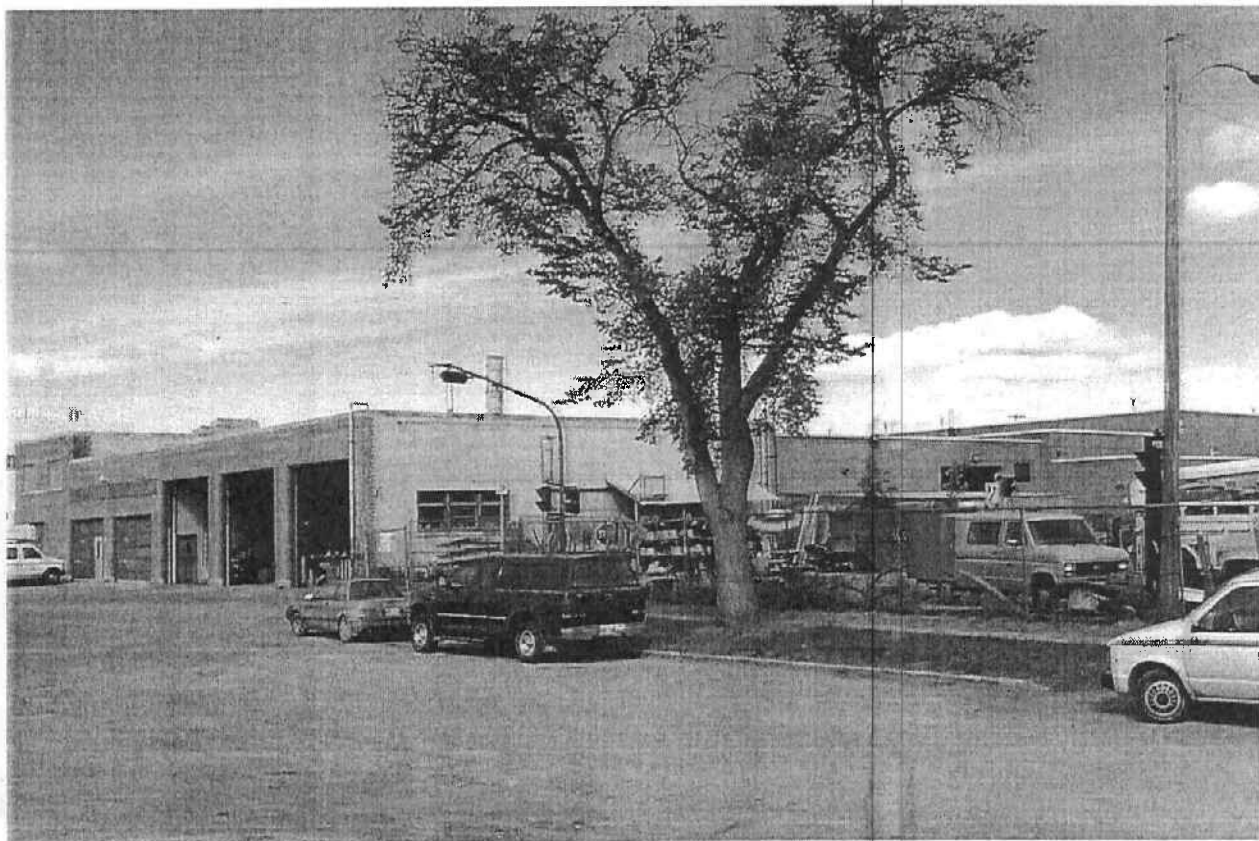


Photo #1



Photo #5

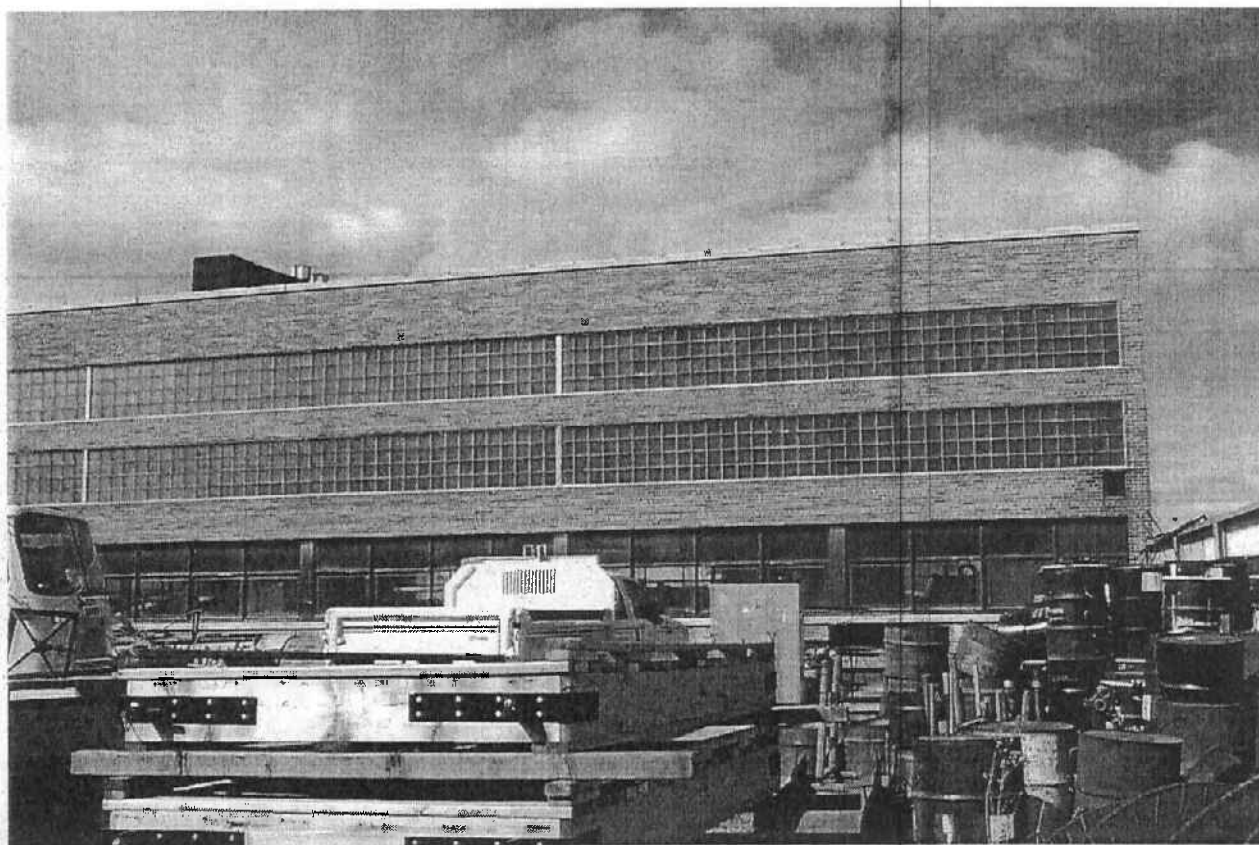
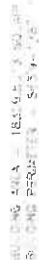


Photo #6



152" = 1' - 0"