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Serviceability Brief

Zoning By-law Amendment
617 Bank St, Ottawa ON

Prepared for:

Domicile Holdings Inc.
1-371A Richmond Rd,
Ottawa, ON.
K2E 8A7

Attention: Rick Morris

LRL File No.: 230479

November 09th, 2023



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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates LTD. was retained by Domicile Developments Inc. to prepare a serviceability brief to support the Zoning By-law amendment application for the change of use for an existing mixed-use commercial/residential building to an office space located at 617 Bank Street in the City of Ottawa. The current zoning restricts office use along the frontage of Bank Street. This application is to permit office uses within a depth of six metres of the front wall of the main building abutting the street.

The subject site is within the Capital Ward, located on the east side of Bank Street and has an approximate area of 0.10 ha, south of Strathcona Avenue and north of Patterson Avenue. The land is currently occupied by a four-storey mixed-use commercial/residential building (19 residential units) and one level underground parking which can accommodate approximately 22 vehicles. The subject site can be seen below in Figure 1.



Figure 1: Aerial View of Subject Lands

2 EXISTING SITE AND AVAILABLE SERVICES

The building covers approximately 86% of the total site area. The remaining 14% consists mostly of a hard surfaced garage ramp. Utilizing the GeoOttawa mapping portal and available data, the following services are running along the three frontages within the right-of-way in front of the property boundary:

Bank Street:

- 305mm diameter PVC watermain
- 900mm Combined Brick Sewer @ 0.18% Slope



Patterson Avenue:

- 152mm diameter PVC watermain
- 675mm Combined Concrete Sewer @ 0.62% Slope

Strathcona Avenue:

- 152mm diameter PVC watermain
- 375mm Combined PVC Sewer @ 0.52% Slope

3 PREVIOUS STUDY FOR SERVICING

A Site Servicing Design Brief had been prepared in the past by Erion Associates, dated January 2007 and submitted in support of an application for Site Plan Control for the subject building. The report summarized calculations and servicing requirements for the subject building.

Below is a summary of the notable conclusions gathered from the report relating to the site servicing of the existing building as it relates to the proposed change of use.

- General:
 - Based on available drawings for the building the ground floor consisted of Commercial space, amenity/entrance area, and 2 units.
- Sanitary and Storm:
 - A 150mm diameter pipe was used for sanitary connection. The single connection receives all the existing commercial as well as domestic sanitary flows by gravity.
 - The sanitary connection was sized using total fixture count with approximately 383 fixture units as per O.B.C. Sec 7.4.10. This translates to a drainage rate of 7.5 L/s (648 000 L/day) .
 - The design proposes the 150mm diameter sanitary pipe to be at a slope of 2%.
 - A 200 mm diameter storm connection was also proposed/installed to connect to the 900mm x 1550 mm combined sewer along Bank St at the north corner of the building. This connection provides an outlet for all roof drainage by gravity and a separately pumped discharge from the perimeter foundation drain.
- Water connection:
 - A 152mm diameter pipe was used to accommodate the water demands for both domestic and fire flow.

4 SERVICING IMPACT OF BUILDING CHANGE OF USE

The change in use of the ground floor required a review of the existing sizing of the service laterals. Below is a figure of the existing ground floor that will be impacted by the zoning change demonstrating the area impacted by this change.



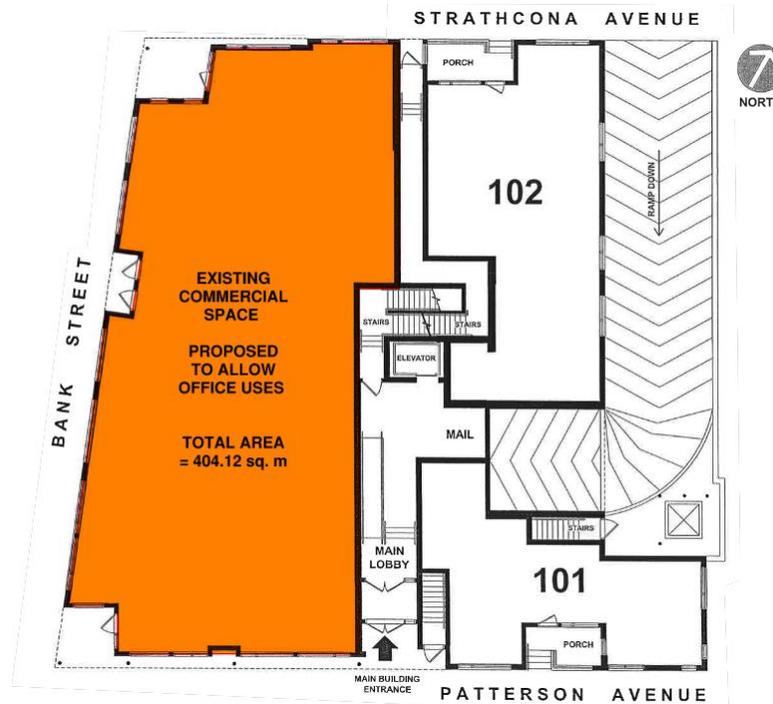


Figure 2: Building Floor Plan with Commercial/Office Use

In the existing use, commercial demands could range drastically based on end user, interior layout and fixture count etc. However; recognizing the zoning in place currently of Traditional Mainstreet (TM H(15)), a common use may be a store, which as per the OBC Table 8.2.1.3 provides a demand of 5.0 L/day per 1.0 m² of floor area. This translates to 2 020.6 L/day. Alternatively, the sanitary design parameter for commercial space of 28 000 L/ha/day could be considered, which calculates to a average daily demand of approximately **1 120.0 L/day**.

As per OBC Table 8.2.1.3, the sanitary demand that is expected to be generated by the revised use of office space is 75 L/day per 9.3m² of floor space. This translates to a demand of total daily sewage flow of **3 259.03 L/day**.

Therefore, the change in use from commercial to allow office space for the entire depth of the main floor could trigger an increase in sanitary demands of approximately 2 139 L/day . The existing service was sized based on a flow of 648 000 L/day. This corresponds to a potential increase of approximately 0.3% of the sanitary flows considered in the original building design.

The proposed change in use will not have an impact on the existing stormwater management or water demands being drawn through the service lateral.

5 EXISTING SERVICE LATERALS

A CCTV was conducted on August 4, 2023 of the service lateral from the cleanout in the building to the main combined sewer in the roadway. LRL has reviewed this to ensure that indeed the laterals were installed, and no major concerns relating to the condition of the laterals exist. The report is included in Appendix B of this document for reference.

6 CONCLUSIONS AND SERVICEABILITY CONSIDERATIONS

This evaluation is limited to assessing the technical feasibility of changing the use of a portion of the existing building to allow office use for the entire depth of the main floor at 617 Bank Street.

Based on the above the conclusions in relation to the serviceability of amending this use are as follows:

- Existing Servicing:
 - It was calculated that having the entire footprint previously considered commercial could potentially produce a demand as low as 1120 L/day. Although, the serviceability report and calculations that were completed at the time of building and site plan approval were based on fixture count.
 - As a due diligence review, if the entire area was considered as office use, the demands could be in the range of 3 259 L/day.
 - This results in an overall increase of only 0.3% to the sanitary demands considered at the original building design 648 000 L/day.
 - Therefore, this increase in demand can be accommodated in the existing service laterals.
 - A CCTV was completed to review the condition of the existing laterals. The laterals appear to be in acceptable condition with no major concerns for ongoing use.

Prepared by:

LRL Associates Ltd.



Virginia Johnson, P. Eng.



APPENDIX A
Erion Associates Site Servicing Design Brief



SITE SERVICES DESIGN BRIEF

&

STORMWATER MANAGEMENT REPORT

for

615 BANK ST.

PROPOSED MIXED USE BUILDING

by

DOMICILE DEVELOPMENTS, INC.
371A RICHMOND RD.
SUITE 1
OTTAWA, ON, K2A 0E7

Prepared by

ERION ASSOCIATES

Project No. EA 05-182

March/2006
Rev. June/2006
Rev. Jan/07

Reference: - SITE SERVICES & GRADING PLAN SSG – 1 (REV. 4 Jan/07
- STORM DRAINAGE AREA PLAN SDA – 1 (REV. 3) Jan/07

Submitted in support of an application for Site Plan Control/Approval
to the City of Ottawa Planning and Growth Management Department.

**SITE SERVICES DESIGN BRIEF
&
STORMWATER MANAGEMENT DESIGN**

for

615 BANK ST.

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FIGURE 1: SITE LOCATION PLAN

(Follows Page 1)

APPENDIX 'A' – Sewer Connection Sizing

APPENDIX 'B' – Stormwater Management Calculations

APPENDIX 'C' – Storm Pump Catalogue Data

APPENDIX 'D' – Existing Combined Sewer Impact

DRAWINGS:

- Site Services and Grading Plan SSG – 1 Rev. '4'

- Storm Drainage AREA Plan SDA – 1 Rev. '3'



**SITE SERVICES DESIGN BRIEF
&
STORMWATER MANAGEMENT REPORT**

(Rev. (09/01/07))

PROJECT: PROPOSED MIXED USE BUILDING
LOCATION: 615 BANK ST., OTTAWA, ON
DEVELOPER: DOMICILE DEVELOPMENTS INC.
371A RICHMOND RD., SUITE 1
OTTAWA, ON, K2A 0E7

1.0 GENERAL

For several years this site, located on the east side of Bank St. from Patterson Ave. to Strathcona Ave., has been utilized as a commercial retail outlet for sporting goods. The site was originally developed as an automobile service station in 1927 and remained in automotive use until approximately 1990. Domicile Developments Inc. now plans to demolish the existing single storey structure and construct a mixed-use commercial/residential building (19 residential units) with 4 floors above grade and one level of underground parking below grade to accommodate 22 vehicles.

2.0 EXISTING CONDITIONS

- The site location shown on FIGURE 1 with an area of 963 sq. metres has frontage on 3 streets as follows:

North side of Patterson Ave.	= 33.4 m
East side of Bank St.	= 31.21 m
South side of Strathcona Ave.	= 28.96 m
- Bank St. is a major arterial road with a 13.4 m wide pavement in an 18.3 m road allowance and is scheduled for reconstruction within the next 5 years. No widening of either pavement width or right-of-way is planned by the City at this location (Ref. – City letter 11/07/05).
- Both Patterson Ave. and Strathcona Ave. were completely reconstructed in 2005 (City Contract 1SB04-5105) including replacement of combined sewers and watermains.
- The existing building is connected to the Bank St. combined sewer and watermain.
- City staff advise that future re-development of this site should be connected to the existing 900 mm x 1550 mm (brick) combined sewer on Bank St. No provision for future sewage flow from this site was taken into account in design of the new combined sewers on either Patterson Ave. or Strathcona Ave.
- Overhead electrical and communication lines exist along all three streets adjacent to the site.
- Natural gas is also available from mains on 3 sides of the site.
- A Phase I & II Environmental Site Assessment was made at this site by Paterson Group (Report PE 0326-01 26/05/05). Remediation by removal of hydrocarbon contaminated soil as part of building foundation excavation is recommended.
- A geotechnical investigation was also carried out by Paterson Group (Report PG – 0584-1, 25/05/05). The site is presently completely paved outside the existing building with a layer of fill extending below the pavement to a depth of approximately 2.0 m from ground surface followed by a grey silty clay crust to depths up to 5 m and grey silty clay continuing to an inferred depth of 11 m.

... (2)

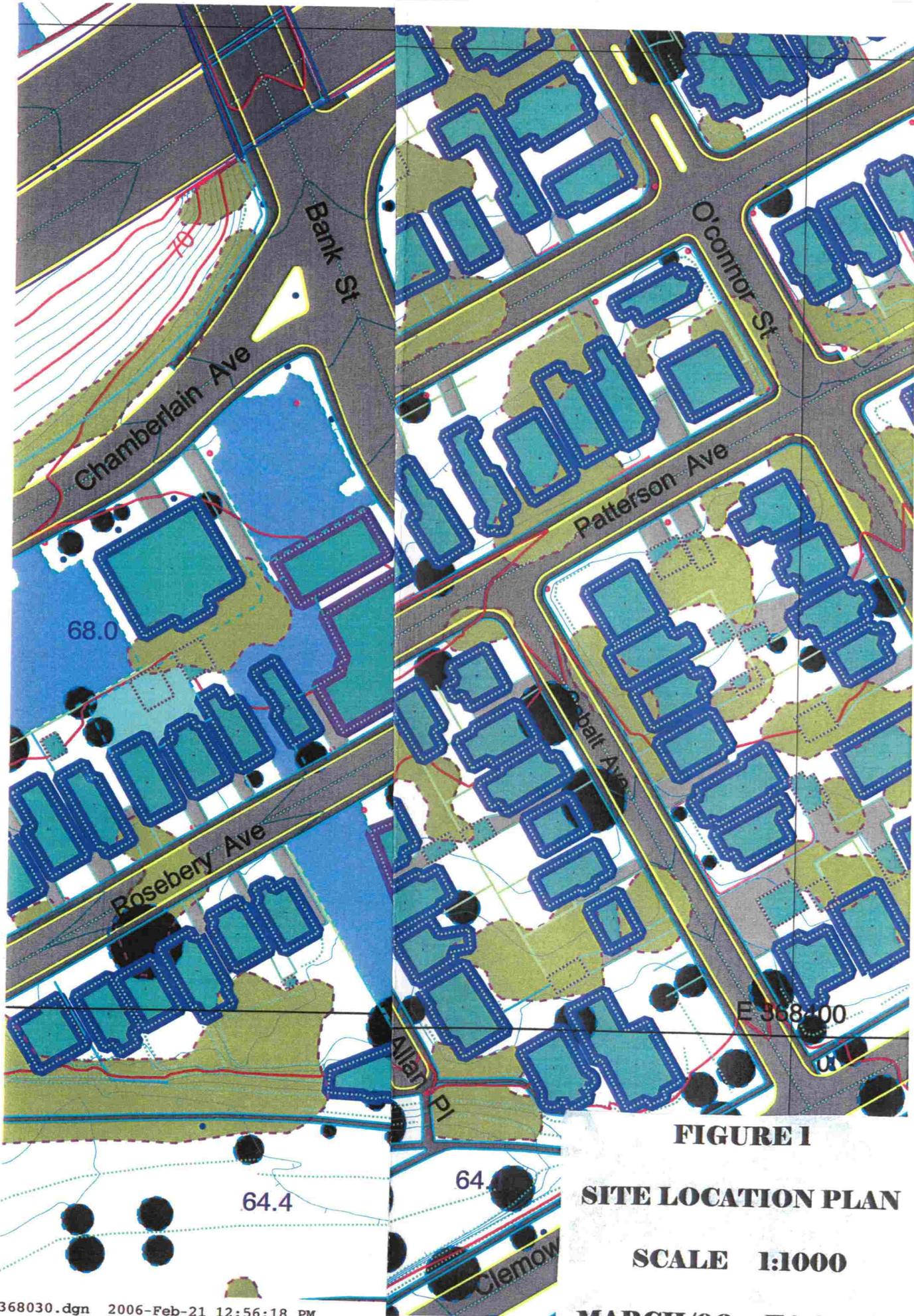


FIGURE I

SITE LOCATION PLAN

SCALE 1:1000

MARCH/06 EA 05-182

3.0 FUTURE BANK ST. RECONSTRUCTION

3.1 Project Description

In 2005, City Council approved in principle the phased re-construction of Bank St. between Wellington St. and Landsdowne Park. This project will include replacement of watermains and augmentation of the combined sewer system to alleviate flooding during major storm events. Work is commencing on the northern end of Bank St. in 2006 while the section in front of 615 Bank St. is expected to undergo reconstruction within the next 5 years.

3.2 O'Connor Drainage Area Flood Control Study

This recently completed study has adopted a technically preferred alternative (No. 3A) that specifies "combined trunk twinning with downstream throttles at ---- Bank St. south of Isabella." This translates to construction of a combined storage conduit equivalent in size to a 3 metre diameter pipe to be constructed in the roadway in addition to continued use of the existing 900 mm x 1550 mm combined sewer at this location. While detailed design is not complete, it is reasonable to assume that the large new storage conduit will probably be located in the west half of the roadway in front of 615 Bank St., this being the only space available if the existing sewer is to be maintained.

4.0 PROPOSED SITE SERVICES

4.1 Water Connection

The proposed building will be fully sprinklered. Mechanical consultant, M & E Engineering Ltd., advises that a 152 mm dia. connection is required to accommodate both domestic and fire flow demands.

City staff (P. Leblanc) indicates that static pressure of 56 psi (elev. 67.4) can be expected with available fire flow of 6880 L/min. @ 20 psi from the new hydrant on Strathcona Ave. at Bank St. A hydrant on Patterson Ave. near Bank St. will provide approximately 7200 L/min. of fire flow according to the City model.

An existing 127 mm UCI main constructed in 1910 along Bank St. will be replaced by a 305 mm main as part of the Bank St. reconstruction project in future. City staff has directed that the new building be connected to the existing 127 mm dia. watermain on Bank St.

4.2 Sanitary & Storm Connections

Separate sanitary and storm sewer connections are proposed to connect to the 900 mm x 1550 mm combined sewer along the east side of Bank St. at the north-west corner of the building.

An inquiry through City staff (P. Leblanc) to Delcan consultants reveals that the future planned combined trunk storage pipe in Bank St. between Isabella & Pretoria will be subject to a maximum hydraulic grade line (HGL) of approximately elev. 65.3 m (Alt. 3A modeling results). Until Bank St. is reconstructed, the HLG in the existing combined sewer is estimated at elev. approximately 67.3 ± for the 1:100 yr. storm event, by the City Consultants.

... (3)



The building basement floor is proposed at 65.05 along the Bank St. wall with a lowest internal floor elevation of 64.33. Both storm and sanitary building sewer connections at the Bank St. wall are proposed at invert elevation 65.80 to allow for additional increase in HGL between Pretoria Ave. and Patterson Ave. as well as a minimum freeboard of 0.30 m above HGL in the long term.

In the interim, with the existing combined sewer system having an H.G.L. higher than elev. 65.3, the building is protected by pumping of basement level drainage (both sanitary and storm) with check valves on the discharge side of all pumps and upper level plumbing drainage system attached to the basement walls and capable of withstanding approximately 3 m of static pressure head, including cleanout caps and all other fittings.

The storm connection (200 mm dia.) will provide an outlet for all roof drainage by gravity plus pumped discharge from the outside access ramp to the underground garage sump and a separately pumped discharge from the perimeter foundation drain and underfloor drainage. Refer to Appendix 'B' for calculations of peak flows (restricted and unrestricted).

The sanitary connection (150 mm dia.) will receive all commercial and domestic flows by gravity as well as pumped discharge of basement floor drains.

Refer to Appendix 'A' for sewer connection sizing calculations and to Appendix 'C' for storm pump catalogue data.

5.0 STORMWATER MANAGEMENT

5.1 Design Criteria

All surface runoff from this project will be delivered to a combined sewer system that will transport same to the treatment plant (R.O.P.E.C.). On-site water quality treatment of runoff is therefore not required here.

The existing site is 100% covered by surface paving (84%) and flat building roof (16%). Existing runoff is therefore captured directly by the City street catchbasins and combined sewers without on-site restriction. During reconstruction of Patterson Ave. and Strathcona Ave. in 2005, inlet control devices were installed in street C.B.'s on these streets and a temporary stop-log flow control was installed into the Patterson Ave. sewer upstream of the connection to the Bank St. sewer.

In order to limit surface ponding on City streets during major storm events induced by inlet control devices (ICD's) in the street catchbasins, an overland flow route was provided in the area surrounding this site with an outlet to Central Park at the south-east corner of Patterson/Bank intersection.

... (4)



The proposed combined sewer storage pipe to be installed as part of the future reconstruction of Bank St. has been sized by DDSWMM computer modeling to capture runoff from flat roofed buildings along Bank St. assuming a directly connected impervious ratio (DCI) of 100% with a capture rate of 1:1. This translates to no on-site attenuation assumed for existing Bank St. properties.

For re-development of existing properties it has been the City's policy for many years to require on-site SWM to control site runoff so that the existing City sewers are not loaded beyond their design capacity. The proposed new building is expected to be completed in 2007, a few years in advance of combined sewer twinning on Bank St. A degree of on-site runoff control is proposed that will represent an improvement over the existing situation and will also reduce site generated flows in future to less than the design assumptions used in flood control design by modeling.

While the City has often required that re-development in combined sewer areas require a degree of on-site attenuation equivalent to the use of $C = 0.40$ in the rational method formula, the use of such simplistic and restrictive constraint here is not possible. Taking into account the totality of all constraints imposed on this site by zoning regulations and boundary conditions, the proposed building maintains the purpose and intent of Traditional Mainstreets and Intensification policies of the Official Plan while providing a development which is both in scale and otherwise compatible with the neighbourhood. By process of iteration it has been determined that the value of $C = 0.70$ is the lowest that will permit roof controls and attenuation storage to function reasonably, given the spaces available for same. This results in an allowable total maximum site release rate of only 15.7 L/sec in a manner that reduces flows to the existing combined sewer from those delivered by the existing site conditions.

For detailed calculations demonstrating this statement, refer to Appendix 'D'.

5.2 Allowable Release Rate

The proposed total site release rate to the combined sewer system is calculated using the Rational method formula as follows.

$$Q = 2.78 \text{ C.I.A. (1:5yr. storm)}$$

where

$$C = 0.70$$

$$I = 83.56 \text{ mm/hr. (Tc=15min)}$$

$$A = 0.0963 \text{ ha}$$

$$Q \text{ release} = 2.78 \times 0.70 \times 83.56 \times 0.0963 = 15.7 \text{ L/sec}$$

... (5)



5.3 Garage Entry Ramp

The north/south portion of the garage entry ramp off of Strathcona Ave. (area A1/Dwg., SDA-1) is uncovered and slopes continuously to the basement floor level. Runoff from area A1 is collected at the garage entry door (EL. 65.00) and will require pumping to the city system to avoid back flow into the building from the higher HGL in the combined sewer system. This entire ramp will be heated for winter use. A pump to deliver 1.5L/sec (24USGPM) has been selected to lift the ramp drainage to the 200dia storm sewer connection (invert elev. 65.75 at building wall). In addition, underfloor attenuation storage is provided in the form of a sump tank, catch basin at the garage entry door and connecting pipe to match the accumulating runoff volume generated by a 1:100 yr storm. See Appendix 'B' for storage volume requirement and Appendix 'C' for pump specifications provided by M&E Engineering Ltd, mechanical consultant to this project.

5.4 Ground Surface

Only three small areas totaling 18.8 sq. m. will sheet drain to the city roadway as shown on Dwg. SDA-1 (Grade Level "0"-areas A2, A2A and A3.)

5.5 Roof Surfaces

Referring to Dwg. SDA-1, there are 5 levels of roof surfaces.

- Area A4 (Level 1) at the north west corner of the building is a small canopy roof where runoff will be discharged directly onto area A2 below, to drain by sheet drainage to the city street adjacent.
- Area A5 (Level 1), A6 (Level 2), A7 and A8 (on Level 3) are too small to be used for attenuation purposes and are all assigned to condo owners for exclusive use.
- Only areas on Levels 4 and 5 will be utilized for roof attenuation storage purposes. All of these areas are part of the common elements of the proposed condominium corporation.
- Areas A6 and A12 (Level 4) are sloped to drain to areas A9 and A11 that are depressed to form ponding areas to a maximum depth of 200mm before overflowing via a roof scupper through the parapet edge to A6 and A1 below.
- Areas A13, A14 and A15 (Level 5) are all separate ponding areas to a maximum depth of 100 mm before overflowing through a scupper on the edge to areas A9 and A11 below.
- Table 1 summarizes attenuated and unattenuated runoff release for the 100 yr storm event together with storage volumes.
- For detailed calculations refer to appendices A & B.

... (6)



TABLE 1

SUMMARY OF ON-SITE RUNOFF
ATTENUATION & RELEASE
(POST RE-DEVELOPMENT)

LOCATION	TOTAL AREAS (m ²)		STORAGE VOL(m ³)		MAX RELEASE RATE L/s	COMMENT
	UNATTEN.	ATTENUATED	REQ'D	PROVIDED		
BASEMENT GARAGE	N/A	N/A	3.5	3.5*	1.5	OUTSIDE GARAGE RAMP BY PUMP FROM BASEMENT
GRADE LEVEL 0	19.9	156.1	N/A	N/A	N/A	
ROOF LEVELS 1,2 & 3	161.7	NONE	N/A	N/A	N/A	
ROOF LEVEL 4	NONE	374.6	8.3	11.2*	4.3	
ROOF LEVEL 5	NONE	250.7	5.9	8.4*	2.7	
SUB- TOTALS	181.6	781.4	17.7	2.31	8.5	781.4 m ²
UNATTENUATED RELEASE (1:100 YR)					7.2	181.6 m ²
TOTAL SITE RELEASE					15.7	963.0 m ²

* MAX. VOLUME TO OVERFLOW LEVEL

6.0 OVERLAND FLOW SYSTEM

As part of new construction on Strathcona & Patterson Avenues in 2005 (City Contract 5105), provision for safe transport of major runoff flows on both streets was provided for in the new street grades. Dwg. SSG - 1 shows the overland flow route to Central Park.

Ponding induced by ICD control in the low point C.B.'s on Strathcona Ave. is limited by the high point gutter grade at the Strathcona/Bank St. intersection (Elev. 67.43) which is 0.17 m below the proposed high point of the garage access ramp off Strathcona (Elev. 67.60 m).

7.0 EROSION & SEDIMENT CONTROL**7.1 Long Term**

The building covers approximately 86% of the total site area. The remaining 14% is mostly the hard surfaced garage ramp, the drainage from which is routed through a grit collection storage tank and sump before pumping to the storm sewer connection. Garage floor drains are also pumped. No other special sediment control devices are required for the long term.

... (7)



(7)

Design Brief

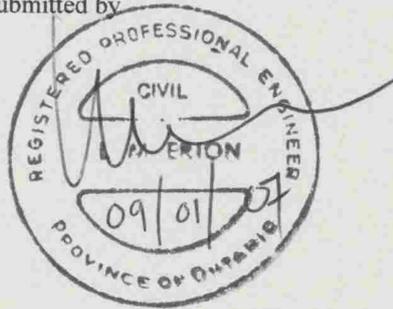
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7.2 Construction Phase

This site will be entirely excavated to approximately 2.5 to 3.0 meters below grade with vertical shoring installed along the perimeter. All runoff during this phase will therefore be in the form of excavation dewatering with pumping behind silt trap sumps in accordance with Best Management Practices(B.M.P.'s) that are specified in detail on Note 20, Dwg. SSG-1.

Report Prepared & Submitted by

L.M. Erion P.Eng.
Erion Associates
March 07,2006
(Rev. 09/01/07)



APPENDIX 'A'

EA 05-182

615 BANK ST.

(Rev. 09/01/07)

PROPOSED MIXED USE BUILDING

SEWER CONNECTION SIZING

A. SANITARY

Reference: O.B.C. Sec. 7.4.10

Total Fixture Units per Mech. Cons. = 383 ±

Drainage Rate per Table 7.4.10.3 B = 99 I.G.P.M. (7.5 L/s)

Capacity of pipe (65% Full)
per Table 7.4.10.3 C
6" DIA (150 mm) @ 1.0% = 185 I.G.P.M.

SELECT 150 mm dia. PVC @ 2%

B. STORM

Size of storm sewer based on 1:5 yr. storm (Rational Method) with no restrictions or controls in place.

$$Q = 2.78 \times C \times I \times A$$

where A = 963 sq. m

$$C = 0.90$$

$$I = 83.56 \text{ mm/hr. (Tc = 15 min.)}$$

$$Q_{\text{peak}} = 2.78 \times 0.90 \times 83.56 \times 0.963 = 20.1 \text{ L/s.}$$

SELECT 200 mm dia. PVC @ 2.0%

$$Q = 48.4 \text{ L/s}$$

$$V = 1.49 \text{ m/s}$$

APPENDIX 'B'

EA 05-182

615 BANK ST.

(Rev. 09/01/07)

PROPOSED MIXED USE BUILDING

STORMWATER RUNOFF ATTENUATION
CALCULATIONS

Reference: Dwg. SDA - 1 (STORM DRAINAGE AREA PLAN)

1.0 ALLOWABLE SITE RELEASE RATE

Site Area = 963 sq. m = 0.0963 ha.
 = 0.70 (Rational Method)
 = 83.56 mm/hr. (Tc = 15 min./1:5 yr.)

Q RELEASE = 2.78 x 0.70 x 83.56 x 0.0963
 = 15.7 L/sec.

2.0 GARAGE RAMP

Total Area = 156.1 sq. m (Area A1/Level 0)
 Hard Surface = 140.8 sq. m
 Soft Surface = 15.3 sq. m
 'C' factor = $\frac{(140.8 \times 0.9) + (15.3 \times 0.2)}{156.1} = 0.83$

- Q100 YR = 2.78 x 0.83 x 0.01561 x I100
 = 0.0360185 x I100
- Release Rate assigned @ 1.5 L/sec (24 USGPM) See Mechanical Design Dwg. for pump selection.
- Storage Required (Modified Rational Method) for 1:100 yr. rainfall event.

Tc	I100	Q100	QR	QSTOR	VSTOR
min	mm/hr.	L/s	L/s	L/s	c.m
10	178.6	6.4	1.5	4.9	2.94
15	142.9	5.1	1.5	3.6	3.24
20	120	4.3	1.5	2.8	3.36 <
25	103.9	3.7	1.5	2.2	3.30

Max. storage volume required = 3.4 c.m.

- Storage Provided

Ramp C.B.	4.0 m x 0.3 x 0.3	= 0.36 c.m.
150 dia. Pipe	24 m x 0.018	= 0.43
Storage Tank	3.0 mL x 0.9W x 1.1 D	= 3.00
		3.79 c.m. (< 3.4)

3.0 UNATTENUATED DISCHARGE

Area = 181.6 sq. m (Areas A2 thru A8).
 Tc = 15 min., I100 = 142.9 mm/hr.
 C = 0.90

- Qu = 2.78 x 0.90 x 142.9 x 0.01816
 = 6.5 L/sec.



4.0 ATTENUATED DISCHARGE

- Allowable Net Release = $15.7 - 1.5 - 6.5 = 7.7$ L/sec. (USE 7.0 L/sec.)
- Distribution of Net Release

Level 4	4.3 L/sec
Level 5	<u>2.7</u> L/sec
	7.0

5.0 ROOF LEVEL 4

- Area = 374.6 sq. m
- $Q_{100} = 2.78 \times 0.90 \times 0.03746 \times I_{100}$
= $0.093725 \times I_{100}$.

Tc	I100	Q100	-	QR	=	QSTOR	VSTOR
<u>min.</u>	<u>mm/hr.</u>	<u>L/s</u>		<u>L/s</u>		<u>L/s</u>	<u>c.m.</u>
10	178.6	16.7		4.3		12.4	7.44
15	142.9	13.4		4.3		9.1	8.19
20	120	11.2		4.3		6.9	8.28 <
25	103.9	9.7		4.3		5.4	8.10

- Max. storage volume required = 8.3 cu. m.
- Storage Volume provided in Areas A9 & A11 (Refer to X-Section 'A - A' on Dwg. SDA -1)

$$\text{Volume} = \frac{(55.6 + 79.5) \times 0.10}{3} = 4.50$$

$$+ 135.1 \times 0.05 = \underline{6.75}$$
 11.25 cu. m. (> 8.3)

6.0 ROOF LEVEL 5

- Area = 251 sq. m
- $Q_{100} = 2.78 \times 0.90 \times 0.0251 \times I_{100} = 0.0628002 \times I_{100}$

Tc	I100	Q100	-	QR	=	QSTOR	VSTOR
<u>min.</u>	<u>min/hr.</u>	<u>L/s</u>		<u>L/s</u>		<u>L/s</u>	<u>c.m</u>
10	178.6	11.2		2.7		8.5	5.10
15	142.9	9.0		2.7		6.3	5.67
20	120	7.5		2.7		4.8	5.76
25	103.9	6.5		2.7		3.8	5.85 <
30	91.9	5.8		2.7		3.1	5.58

- Max. storage volume required = 5.9 cu. c.m.
- Storage volume provided in Areas A 13, A 14, A 15

$$\text{Volume} = \frac{(85.1 + 66.5 + 99.1) \times 0.10}{3}$$
 = 8.35 cu. c.m. (>5.9)

7.0 ROOF DRAINS

Mechanical Engineer to specify roof drain controls to meet the following release rates:

<u>Roof Level</u>	<u>Total Release</u>	<u>No. of Drains</u>	<u>Max. Release</u>
4	4.3 L/sec.	2	2.15 L/s (34 USGPM)
5	2.7 L/sec.	3	0.9 L/s (14 USGPM)



APPENDIX 'D'

EA 05-182
(Rev. 09/01/07)

615 BANK ST. PROPOSED MIXED USE BUILDING

CALCULATION OF DRAINAGE IMPACT ON EXISTING BANK ST. COMBINED SEWER

Reference: - DWG SDA -1, (EXISTING CONDITION)

A. PRIOR TO AUTUMN, 2005

- Both Patterson Ave. and Strathcona Ave. combined sewers and street catchbasins inlets were connected to the Bank St. combined sewer with no inlet controls.
- Due to the close proximity of the roadway edge to the site, sheet drainage from the completely paved site surface as well as the building roof drain can be considered as directly connected to the Bank St. sewer with flows calculated by the Rational Method formula as follows: ($T_c = 15$ min.)
 $Q_5 = 2.78 \times 0.90 \times 83.56 \times 0.0963 = 20.1$ L/sec.

$$Q_{100} = 2.78 \times 0.90 \times 142.9 \times 0.0963 = 34.4 \text{ L/sec.}$$

B. AUTUMN 2005 TO PRESENT

- Completion of City Contract 1SB05-5105, Strathcona Ave. combined sewer is no longer connected to Bank St. and Patterson Ave. combined sewer is controlled by a temporary stop-log restriction to a 1:2 year storm rate of discharge to the Bank St. combined sewer. The two Bank St. catchbasins remain uncontrolled.
- Existing flows to Bank St. are calculated as follows:
Existing Areas X1 + X2 = 558 s.m. (directly to Bank)
 $Q_2 = 2.78 \times 0.90 \times 83.56 \times 0.0558 = 11.6$ L/sec.
 $Q_{100} = 2.78 \times 0.90 \times 142.9 \times 0.0558 = 19.9$ L/sec.

Plus Existing Area X4 = 209 s.m. (to Bank via Patterson)

$$Q_2 = 2.78 \times 0.90 \times 61.79 \times 0.0209 = 4.5 \text{ L/sec.}$$

$$Q_{100} = \text{controlled to 2 yr. level} = 4.5 \text{ L/sec.}$$

- TOTAL FLOWS TO BANK ST. SEWER AT PRESENT

$$Q_5 = 11.6 + 4.5 = 16.1 \text{ L/sec.}$$

$$Q_{100} = 19.9 + 4.5 = 24.4 \text{ L/sec.}$$

C. PROPOSED POST-DEVELOPMENT

All site generated runoff will be piped directly to the existing Bank St. combined sewer except as follows: (Refer to Table 1, page 6 and Dwg. SDA-1)

- Areas A2 (Level '0') + A4 (Level 1) = 1.4 + 9.6 = 11.0 s.m. to Strathcona Ave.
- Area A3 (Level '0') = 6.6 s.m. to Patterson Ave. sewer controlled then to Bank St. sewer.

Calculation of flow to Bank St. sewer as follows:

Controlled Flow (Table 1)

$$Q_5 = 1.5 + 4.3 + 2.7 = 8.5 \text{ L/s}$$

$$Q_{100} = 1.5 + 4.3 + 2.7 = 8.5 \text{ L/s}$$

... (2)



$$\begin{aligned}
 \text{Uncontrolled Flow Area} &= 164.3 \text{ s.m. (direct to Bank St.)} \\
 \text{plus Area A3} &= 6.3 \text{ s.m. (to Bank via Patterson)} \\
 Q_5 &= 2.78 \times 0.90 \times 83.56 \times 0.01643 = 3.4 \text{ L/s} \\
 + Q_2 \text{ (Patterson)} &= 2.78 \times 0.90 \times 61.79 \times 0.0063 = 0.1 \text{ L/s} \\
 \\
 Q_{100} &= 2.78 \times 0.90 \times 142.9 \times 0.01643 = 5.9 \text{ L/s} \\
 + Q_2 \text{ (Patterson)} &= 2.78 \times 0.90 \times 61.79 \times 0.0066 = 0.1 \text{ L/s}
 \end{aligned}$$

Total Post Redevelopment Flow to Bank St. sewer

$$\begin{aligned}
 Q_5 &= 8.5 + 3.4 + 0.1 = 12.0 \text{ L/s} \\
 Q_{100} &= 8.5 + 5.9 + 0.1 = 14.5 \text{ L/s}
 \end{aligned}$$

D. PEAK FLOW COMPARISON SUMMARY TO BANK ST. SEWER

	<u>PRE 2005</u>	<u>PRESENT CONDITIONS</u>	<u>POST RE-DEV.</u>
	L/s	L/s	L/s
1:5 yr.	20.1	16.1	12.0
1:100 yr.	34.4	24.4	14.5

The proposed design will result in lower peak flows from the site to the existing Bank St. combined sewer and will not contribute to increased sewer surcharge.



APPENDIX B

CCTV Report



Ottawa (Head Office)

1800 Bantree Street
Ottawa, Ontario K1B 5L6

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☎ 613.745.9994

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1.866.695.0155

Montreal

7562, Côte-de-Liesse
St-Laurent, Quebec H4T 1E7

☎ 514.738.2666
☎ 514.738.9762



INTEGRATED SEWER SOLUTIONS

COD

617 Bank

Ottawa, Ontario

DRAIN CCTV INSPECTION REPORT

Report ID
130701

Sewer Use
Sanitary

Completion Date
August 4 2023

Inspected Length
3.6 meters

THE WAY IS CLEAR™

- Watermain Swabbing
- Hydro Vacuum Excavation
- CCTV Inspection of Sewers
- Plumbing & Drain Services
- Structural Rehabilitation of Manholes
- Cured-in-Place-Pipe Lining & Spot Repairs
- Grouting, Test & Seal Joints, Manholes & Services
- Lateral Sewer Inspection & Locates From Main
- Sewer Cleaning, Flushing & Pumping



Index of pipes

2 items

Inspected length : 7.20

Total length : 0.00

Pipe	Start/End	Direction	Road	Date	Inspected	Total	Page
617 Bank_130701_PreCleanin_Insp 1	Cleanout --> Mainline	Direction of flow	617 Bank	04/08/2023 2:28 PM	3.6		5
617 Bank_130701_PreCleanin_Insp 2	Cleanout --> Mainline	Direction of flow	617 Bank	04/08/2023 2:31 PM	3.6		7



Internal condition grade

2 items

1 - Acceptable structural condition (2 of 2 items)

Total	Peak	Pipe	Start/End	Direction	Road	Page
0	0	617 Bank_130701_PreCleanin_Insp 1	Cleanout --> Mainline	Direction of flow	617 Bank	5
0	0	617 Bank_130701_PreCleanin_Insp 2	Cleanout --> Mainline	Direction of flow	617 Bank	7



Operational performance grade

2 items

Grade: 1 (2 of 2 items)

Total	Peak	ICG	Pipe	Start/End	Direction	Road	Page
0	0	1	617 Bank_130701_PreCleanin_Insp 1	Cleanout --> Mainline	Direction of flow	617 Bank	5
0	0	1	617 Bank_130701_PreCleanin_Insp 2	Cleanout --> Mainline	Direction of flow	617 Bank	7

Pipe summary and condition details

Pipe identification

Pipe: 617 Bank_130701_PreCleanin_Insp 1
 Direction of flow: Cleanout --> Mainline

Pipe location

Road: 617 Bank	<u>UPSTREAM</u>	<u>DOWNSTREAM</u>
Crossroad:	Easting (X):	Easting (X):
Drainage Area:	Northing (Y):	Northing (Y):
City: Ottawa	Elevation (Z):	Elevation (Z):
Location:	GPS Accuracy:	
Owner: COD	Corrdinate System:	
Road segment:	Vertical Datum:	

Pipe characteristics

Category: Sanitary	Size: 100
Shape:	Width:
Material: Cast iron	Total length:
Lining:	Pipe unit length:
Type: Lateral	Year laid:
Invert (upstream):	Invert (downstream):
Depth (upstream):	Depth (downstream):
Cover level (upstream):	Cover level (downstream):

Additional details

Inspection standard: WRC 3rd edition	Survey Abandoned:
Date: 04/08/2023 2:28 PM	Inspected length: 3.6
Project Number:	Pre-cleaning: <input type="checkbox"/>
Contractor project #: Clean Water Works	Blocked flow: <input type="checkbox"/>
Client: COD_617 Bank_WO130701	Regular CCTV: <input type="checkbox"/>
Purpose:	Reinspect with ZOOM: <input type="checkbox"/>
Weather:	Medium #:
Operator: David	Start position:
Analyst:	End position:

Internal Condition

Grade: 1
 Total: 0
 Peak: 0

Operational Performance

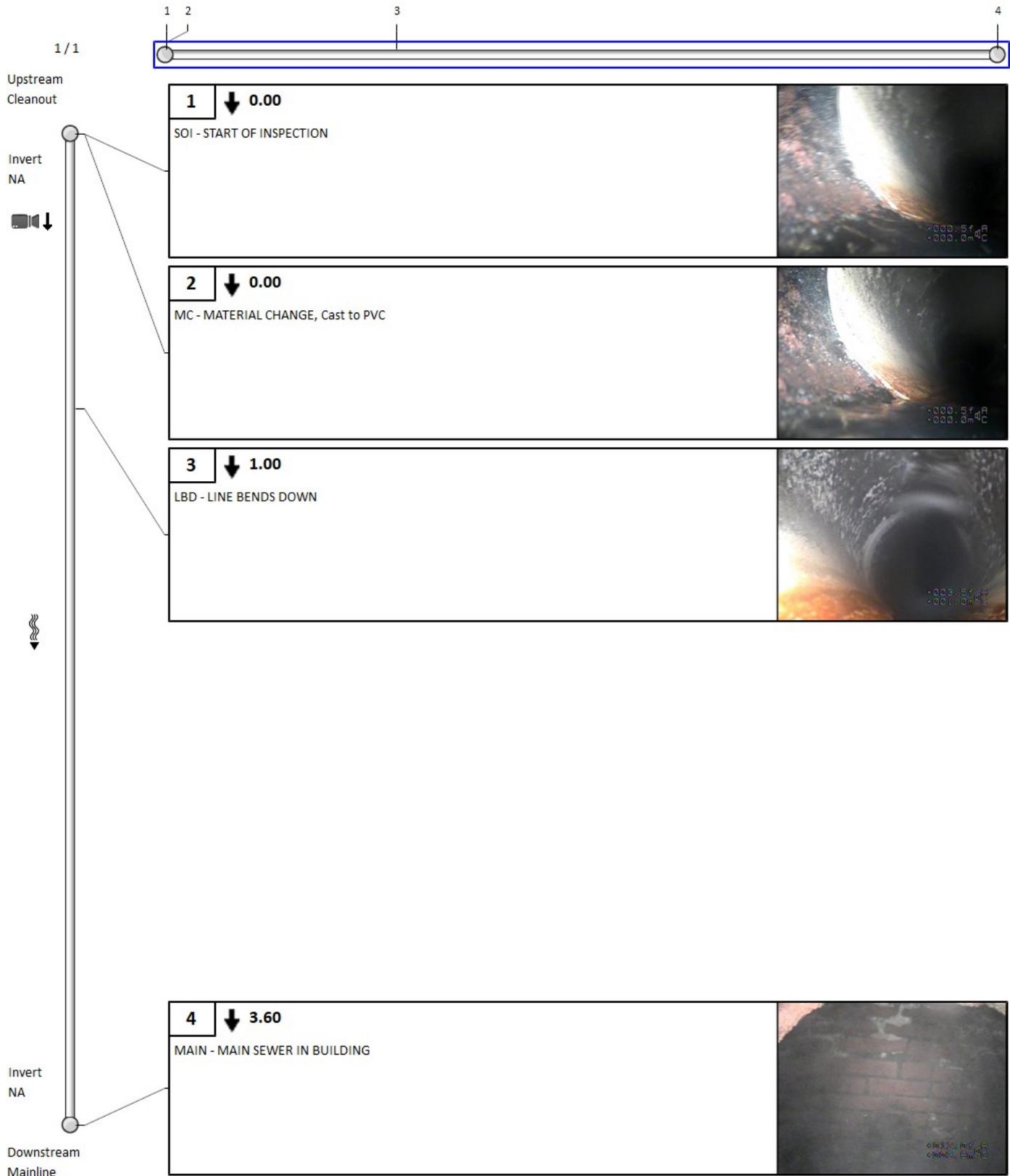
Grade: 1
 Total: 0
 Peak: 0

Comments

Other information

Date: August 4 2023	Information 7:
Work Order#: 130701	Information 8:
Start of Location: Cleanout	Information 9:
End of Location: Mainline	Information 10:
Location:	P15 (MAMR): 0
Information 6:	P16 (MAMR): 0

Pipe summary and condition details



Pipe summary and condition details

Pipe identification

Pipe: 617 Bank_130701_PreCleanin_Insp 2
Direction of flow: Cleanout --> Mainline

Pipe location

Road: 617 Bank	<u>UPSTREAM</u>	<u>DOWNSTREAM</u>
Crossroad:	Easting (X):	Easting (X):
Drainage Area:	Northing (Y):	Northing (Y):
City: Ottawa	Elevation (Z):	Elevation (Z):
Location:	GPS Accuracy:	
Owner: COD	Corrdinate System:	
Road segment:	Vertical Datum:	

Pipe characteristics

Category: Sanitary	Size: 100
Shape:	Width:
Material: Cast iron	Total length:
Lining:	Pipe unit length:
Type: Lateral	Year laid:
Invert (upstream):	Invert (downstream):
Depth (upstream):	Depth (downstream):
Cover level (upstream):	Cover level (downstream):

Additional details

Inspection standard: WRC 3rd edition	Survey Abandoned:
Date: 04/08/2023 2:31 PM	Inspected length: 3.6
Project Number:	Pre-cleaning: <input type="checkbox"/>
Contractor project #: Clean Water Works	Blocked flow: <input type="checkbox"/>
Client: COD_617 Bank_WO130701	Regular CCTV: <input type="checkbox"/>
Purpose:	Reinspect with ZOOM: <input type="checkbox"/>
Weather:	Medium #:
Operator: David	Start position:
Analyst:	End position:

Internal Condition

Grade: 1
Total: 0
Peak: 0

Operational Performance

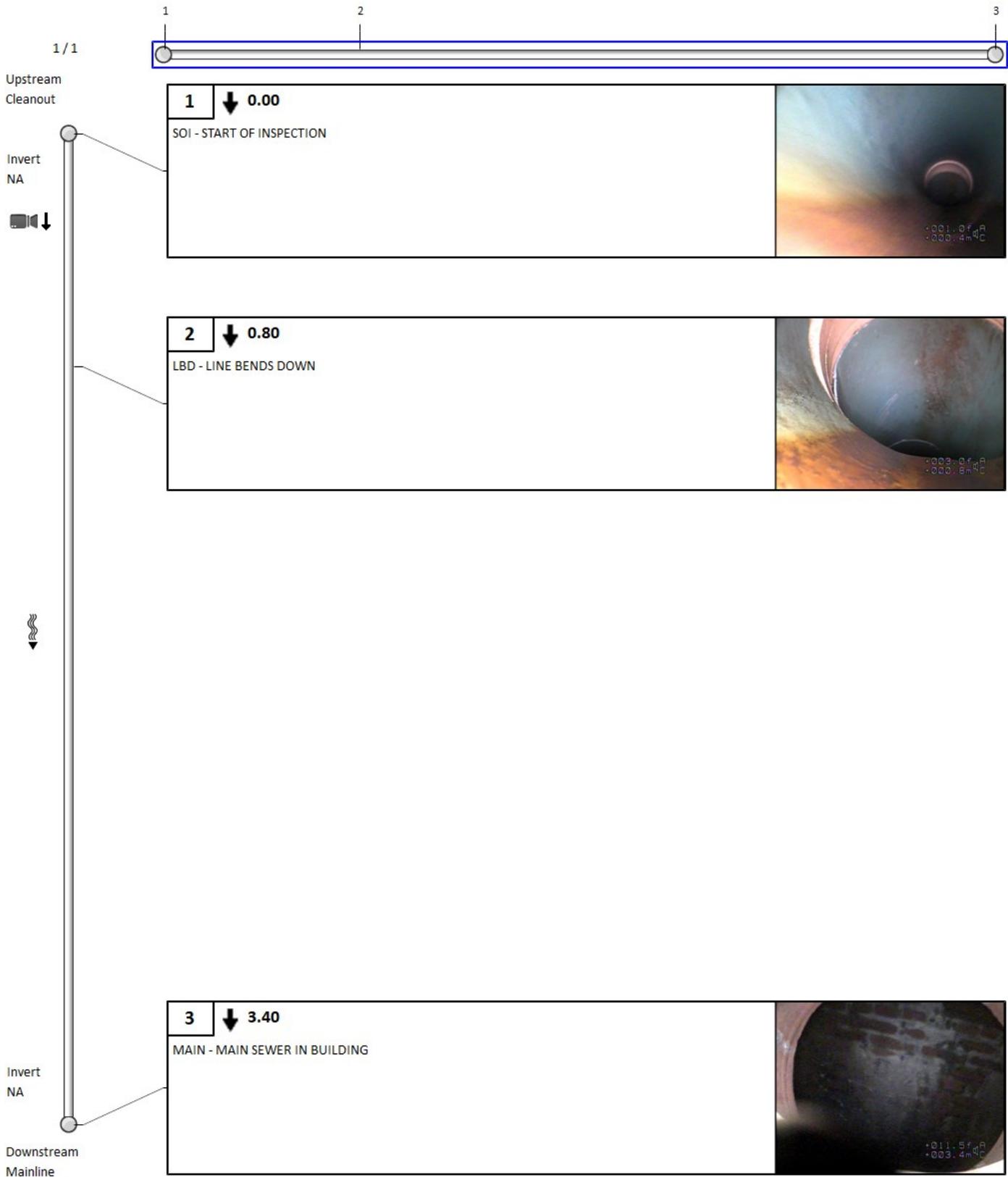
Grade: 1
Total: 0
Peak: 0

Comments

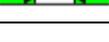
Other information

Date: August 4 2023	Information 7:
Work Order#: 130701	Information 8:
Start of Location: Cleanout	Information 9:
End of Location: Mainline	Information 10:
Location:	P15 (MAMR): 0
Information 6:	P16 (MAMR): 0

Pipe summary and condition details



Vision Report© Legend

	The numbers sequentially identify each observation. They allow you to find complete descriptions and related photos throughout the pages. Note that when the pipe contains too many observations, the Vision© report hides the least important observations to optimize the display*.
60	A number with neither a square nor circle indicates a general observation.
	A circled number indicates a structural anomaly. The color of the circle indicates the severity of the anomaly on a scale of 1 to 5, 5 being the most severe: green=1, blue=2, magenta=3, orange=4 and red=5.
	A number in a square indicates an operation and maintenance anomaly. The color of the square indicates the severity of the anomaly on a scale of 1 to 5, 5 being the most severe: green=1, blue=2, magenta=3, orange=4 and red=5.
◀ 3 / 31 ▶	Indicates the current page number of the inspection report.
	The blue square indicates a section of the pipe; this section is covered in detail on the current page of the report.
	The green line indicates the inspected part of the pipe. The remaining white line indicates the uninspected part of the pipe.
	Indicates the hold points on the camera during an inspection.
	Indicates the hold points on the camera during the reverse inspection.
	Indicates that a reverse inspection was carried out, however the camera did not reach the initial inspection hold point. (the hold point of the initial inspection)
	Indicates that a reverse inspection was carried out and that it has joined (has arrived at) the initial inspection hold point.
401-059B 	Identifies the start manhole number. Note that this manhole is not necessarily the upstream manhole of the pipe.
401-631 	Identifies the end manhole number. Note that this manhole is not necessarily the downstream manhole of the pipe.
	A downward arrow indicates that the inspection was carried out in the direction of the current, whereas an upward arrow indicates an inspection against the current.
	Note that the manhole located on the upper left of the page is always the start manhole, but not necessarily the upstream manhole of the pipe.
	This camera followed by a downward arrow is located on the upper left of the vertical pipe; it indicates that an inspection was done from this manhole.
	When the second camera appears on the bottom left page it means that a reverse inspection was carried out. Information about the reverse inspection is included in the report, thereby combining both inspections.
Invert 3.40	The measurement shown under the word <Invert> indicates the measurements between the frame and the pipe captured during the inspection. This measurement is available at the top left for the start manhole and the bottom left for the end manhole. If the invert was not measured during the inspection, an <NA> mark will be displayed.
	The downward bold arrow to the right of the observation number indicates that this observation was captured during the initial inspection.
	The blank arrow pointing upwards and located to the right of the observation number indicates that this observation was taken during the reverse inspection period, thereby confirming that this report combined both inspections.
18.40 m	Located to the right of the observation number is a number identifying the observation distance in relation to the start of the pipe.
SRV - Armature visible	A full description of the observation code according to the protocol used.

*Any hidden observations are readily accessible from the database as well as in other CTSpec report templates.

** CTSpec inc. reserves the right to modify, eliminate or add to the product features described in this pamphlet without notice.

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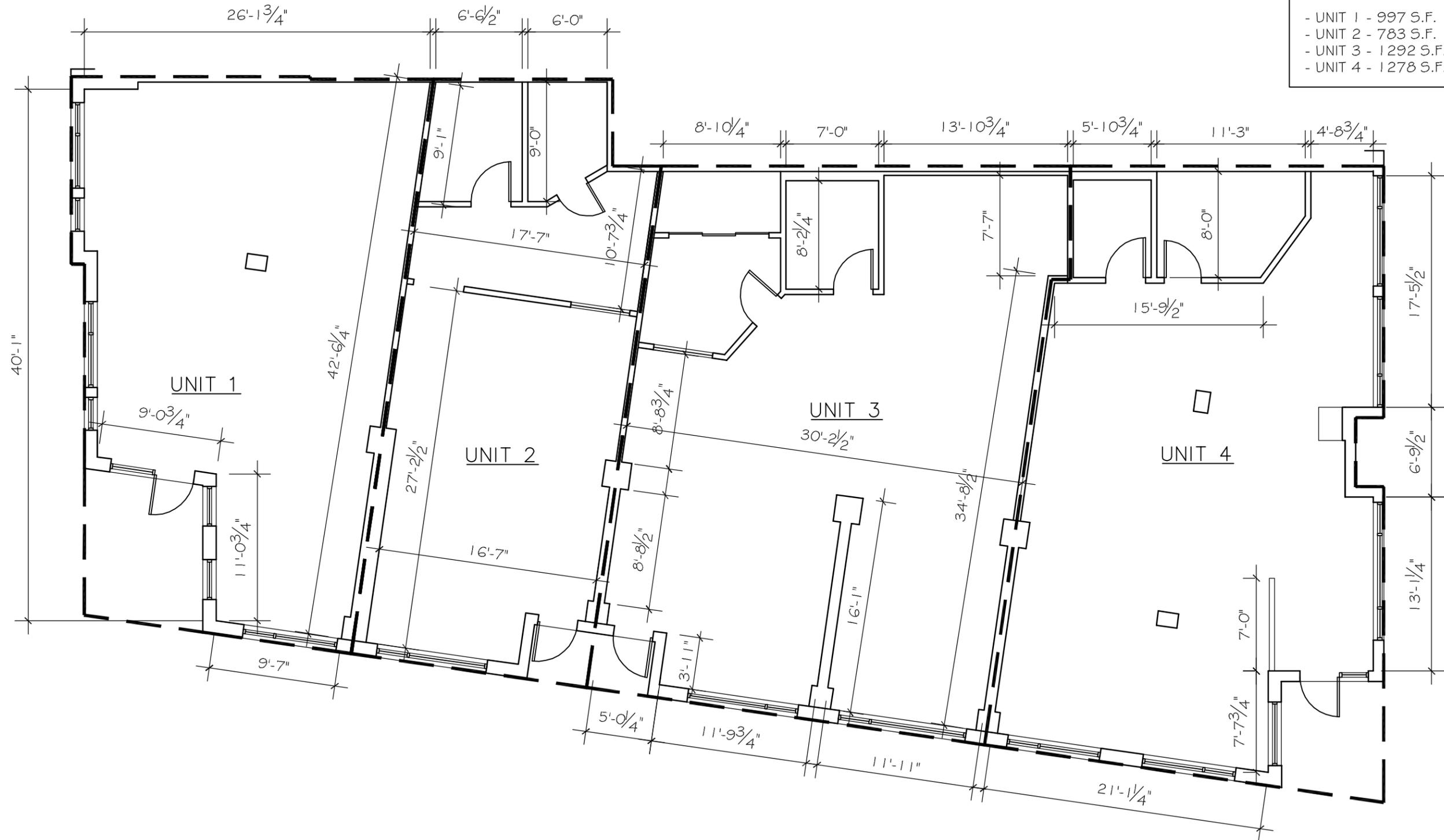
APPENDIX C

Existing Building Plans



AREA CALCULATION:

- UNIT 1 - 997 S.F.
- UNIT 2 - 783 S.F.
- UNIT 3 - 1292 S.F.
- UNIT 4 - 1278 S.F.



KEY PLAN - LOWER LEVEL

REV. MAY 4, 2007

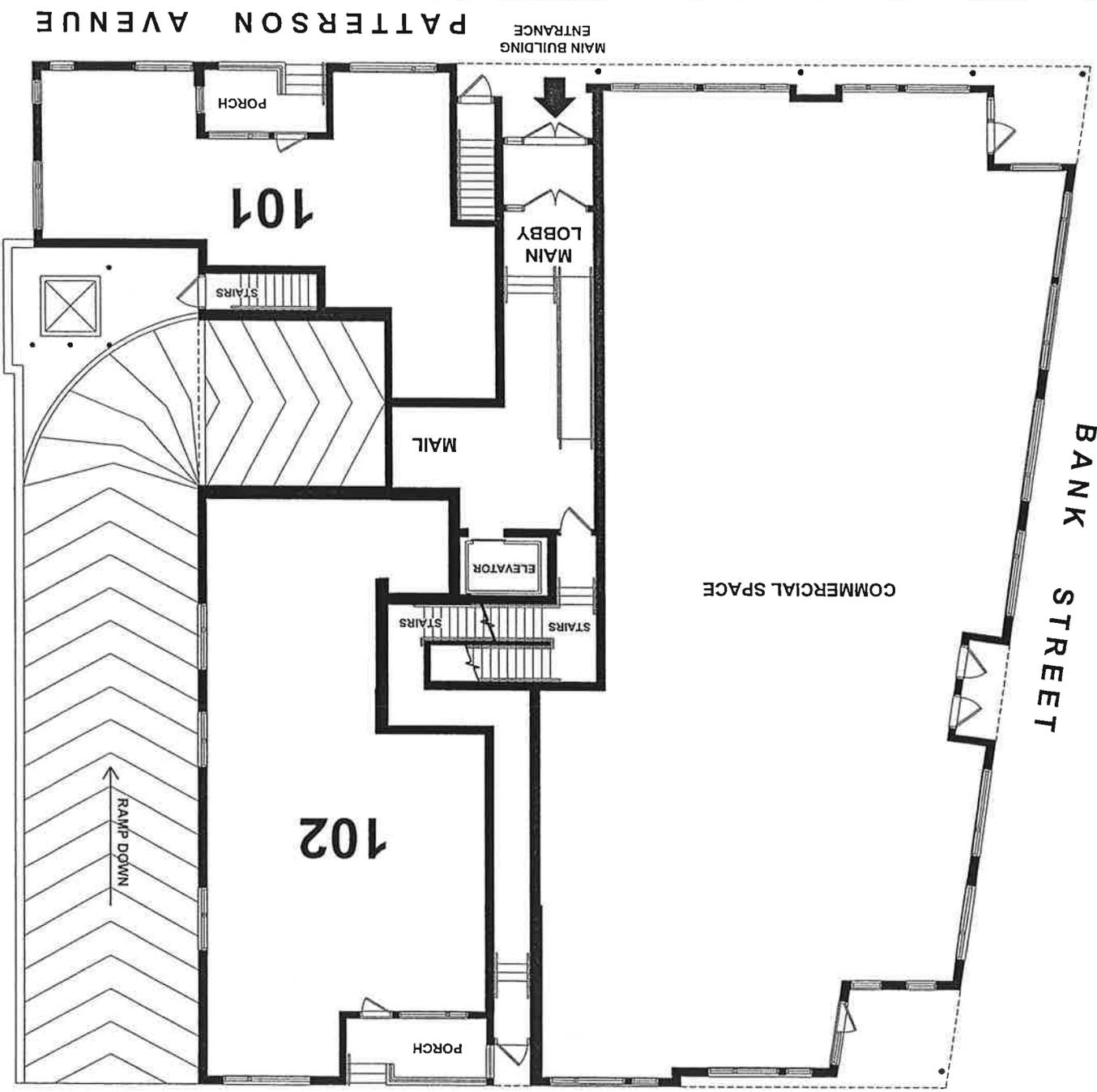


NORTH



KEY PLAN - GROUND FLOOR

REV. MAY 4, 2007



PATTERSON AVENUE

STRATHCONA AVENUE

BANK STREET

MAIN BUILDING ENTRANCE

101

102

COMMERCIAL SPACE

MAIN LOBBY

MAIL

ELEVATOR

STAIRS

STAIRS

STAIRS

PORCH

PORCH

RAMP DOWN

NORTH

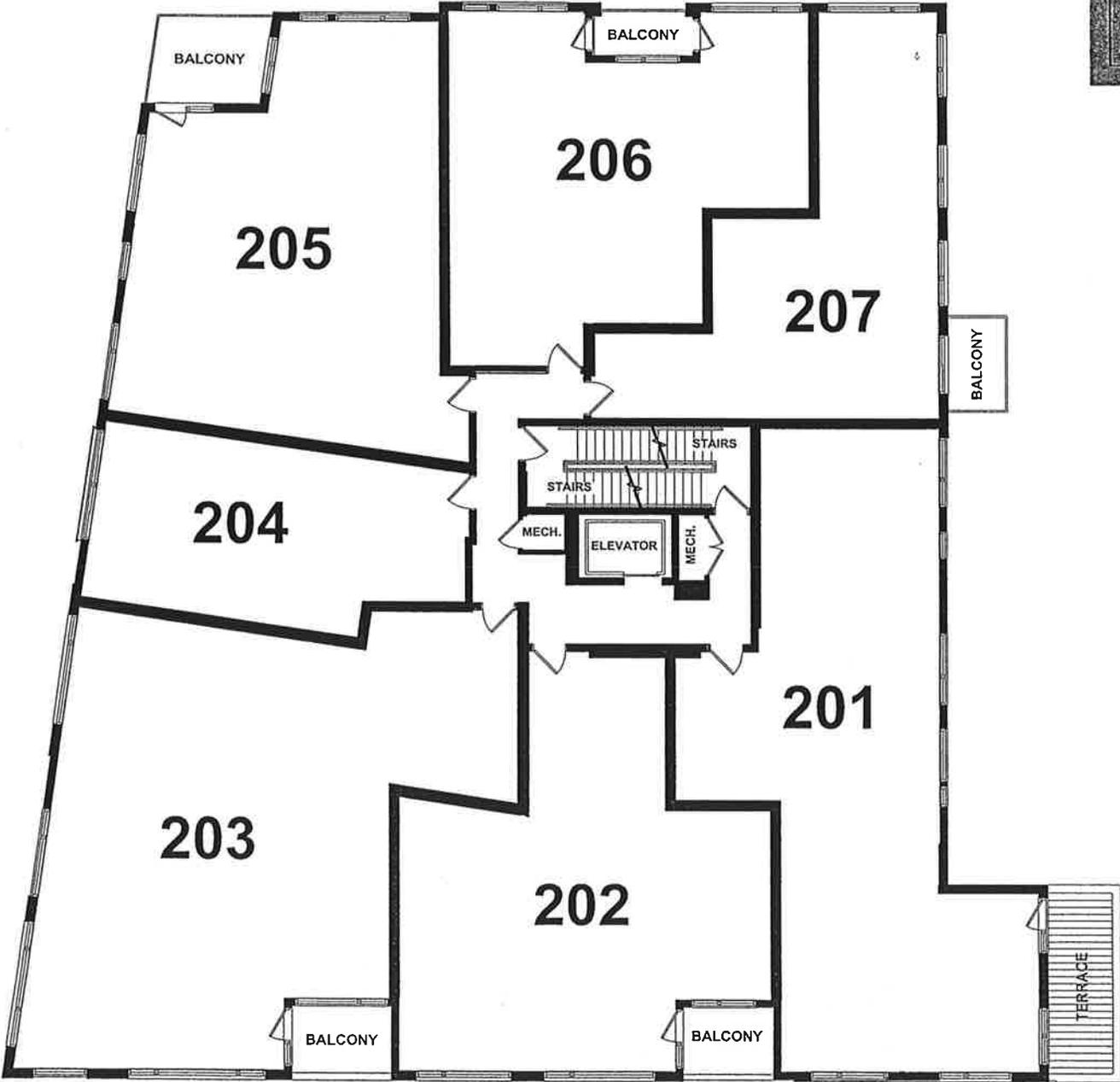


KEY PLAN - SECOND FLOOR

REV. MAY 4, 2007



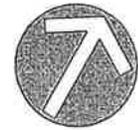
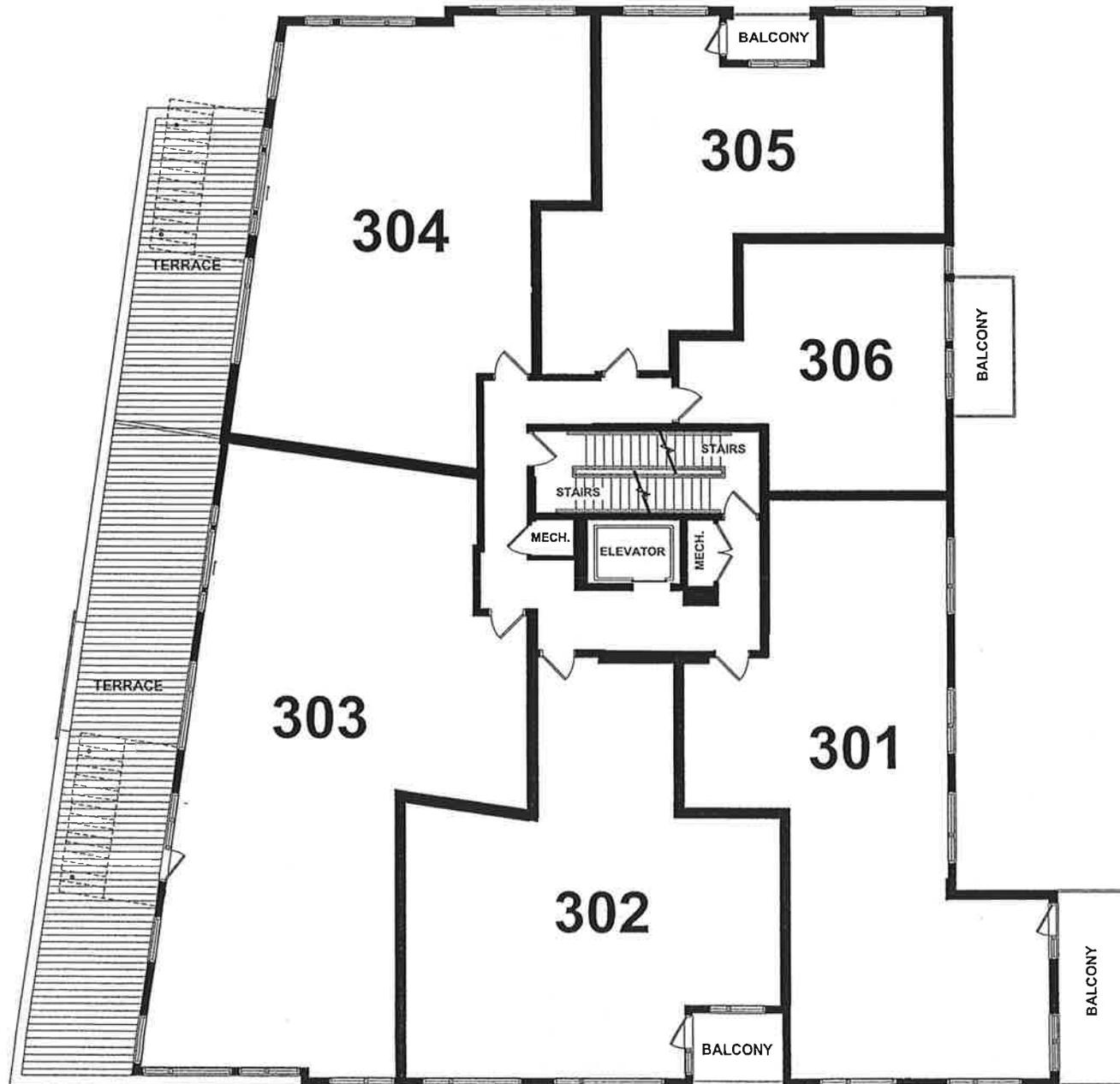
NORTH



E. & O.E.

KEY PLAN - THIRD FLOOR

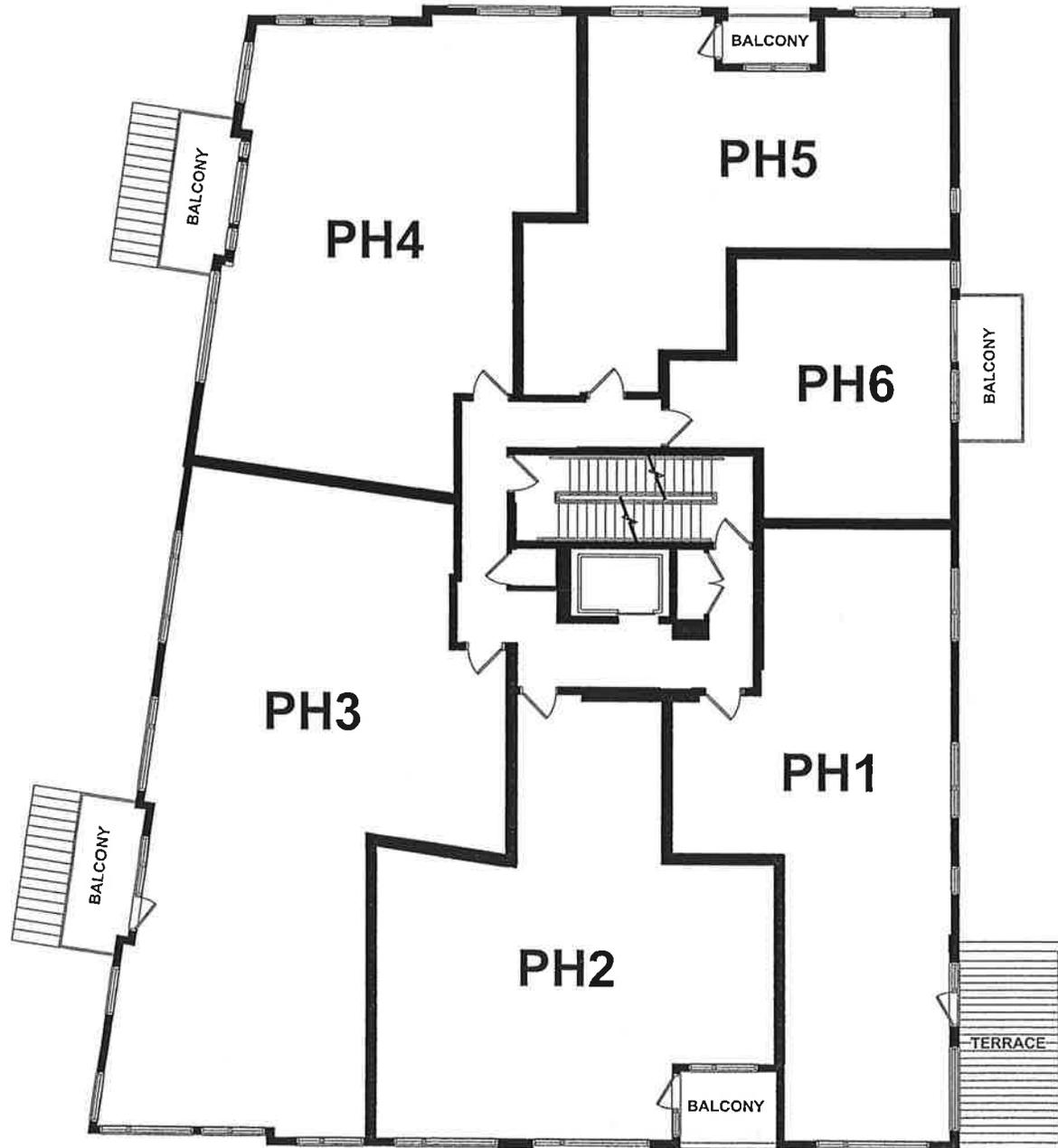
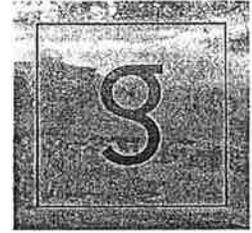
REV. MAY 4, 2007



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KEY PLAN - PENTHOUSE LEVEL

REV. MAY 4, 2007



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