
From: IN Engineering Ltd.
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To:
Malcolm Norwood
mnorwood@rideaulakes.com

Project Location:
Elgin Municipal Building
24-32 Halladay Street
Elgin, ON

May 31, 2021

Introduction

IN Engineering was retained by the Municipality of Rideau Lakes to review the tower of the Elgin Municipal Centre located at 24-32 Halladay Street in Elgin, ON. A structural review was conducted by Mr. Remi-Paul Normand, P.Eng on May 26, 2021. The site visit was limited to a visual review on a preliminary basis.

Background Information

The municipal building houses the municipal library, the town Firehall, as well as the community center. The community centre and tower were built constructed circa 2003. The tower consists of a structural steel frame and brick veneer cladding. The tower is supported on reinforced concrete piers and spread footings. The steel framing is likely boxed in with wood light framing and sheathing.

Since at least 2018 cracks have developed in the brick arches, a contractor installed temporary wood shoring in 2018 to support the brick veneer and prevent further damage.

The municipality has also reported on ponding at the base of the tower due to poor drainage of the site.

Purpose

The purpose of the structural review was to observe and comment on the following items:

1. To review the masonry veneer,
2. Determine probable causes for failure and repair recommendations, and
3. Complete an Engineer's Estimate for repairs.

Methodology

This site review was limited to a visual review only. No non-destructive testing was performed. Based on the preliminary visual review an intrusive investigation may be required during repairs to the masonry.

Photos and notes of the items of concern were recorded during the site visit.

Document Review

At the time of the site visit a set of architectural and structural drawings were provided. The drawings are unstamped and are labeled for Tender. The final construction drawings, specifications, shop drawings were not available for review. The Tender drawings do not bear a stamp of an Architect nor Engineer. No submittals for the masonry were available for review.

Due to the lack of information some assumptions were made in this report which will need to be confirmed on site following an intrusive investigation.

Building Examination

The following notes were recorded during the site visit:

1. The thicker bed joint just above the main arch may indicate that there is a straight brick ledger in that location. An intrusive investigation will need to confirm this assumption.
2. The cracking pattern above the main arch indicates that the lintel is not completely supporting the arch.
3. The cracks in the mortar of the side joint is likely caused by expansion and contraction and a lack of control joints in the masonry. See Figures 7, 21.
4. The masonry below the brick shelf angle has failed with large cracks and was in danger of ultimate failure prior to being shored. See Figures 4, 9, 13, 14.
5. The brick piers are cracked including the concrete pier. The cracks include cracked mortar and bricks. See Figures 18, 19.

Analysis

The brick arch is too shallow to be a self-supporting arch where the bricks are in complete compression. The piers on each side are not heavy enough to act as abutments to resistance the outward lateral loads caused by a compression arch. The primary structural system is a steel frame and it is suspected the bricks are supported by a brick shelf angle.

The poor drainage in the area may also have caused the subgrade below the footings to be saturated. Typically, saturated soils have half the bearing pressure of well-drained soils. The poor drainage may have caused excessive settlement of the foundation piers and pads. Excessive settlement may have caused the cracks in the masonry piers and concrete foundation.

The masonry was constructed with a lack of control joints in the masonry which may cause some cracking due to the expansion and contraction of the masonry.

Some cracking may have been caused by a lack of drainage for moisture stuck behind the wall. Typical arches and lintels will have weeping holes to prevent moisture from collecting. This structure does not appear to have proper weeping holes. Moisture stuck in the wall can expand and cause cracking as well as exasperated weathering.

Other failure modes are also possible but not likely. It is possible that not enough brick ties were installed during construction, this would result in a complete replacement. The primary structural system is a steel frame and the masonry are supported by a lintel. It is not suspected that the lateral thrust caused by a compression arch is affecting the primary steel structure.

Discussion

Some of the arch is not supported by the straight lintel which has led to large cracks below the lintel. It is recommended to install a curved steel angle or a concealed arch spline such as the H&B lintel system (see attached). The installation of a curved lintel would prevent the need to completely replace the masonry.

Drainage in the area shall be improved including ensuring the building's perimeter drain is working properly. The cracks in the masonry and concrete piers are to be repaired with a crack repair epoxy. If the cracking continues to worsen then additional retrofits will be required.

Some cracking was caused by thermal expansion and contraction and a lack of control joints. Control joints could be retrofitted on the structure, but this is a specialized and invasive procedure. Retrofit control joints are not recommended at this time and can be installed if the cracks continue to worsen.

Weeping holes shall be retrofitted at the top of the lintels and base of the walls to ensure moisture can escape the cavity.

Recommended Scope of Work:

1. Remove masonry around brick lintels and confirm location of ledger angle.
2. Install new curved angle lintel or concealed spline lintel.
3. Repair and replace masonry to match existing.
4. Use crack repair epoxy on minor masonry cracks and cracks in the pier.
5. Improve drainage around the base of the tower and confirm perimeter drain is operational.
6. Monitor minor cracks for signs of worsening condition.

Cost Estimate

Cost is estimated at AACE Class 5 or less costs may vary from -20% to + 100% depending on the final project scope of work. This estimate may be used for high level budgeting and concept screening of the project.

Conclusions

The probable cause of the large cracking in the masonry is due to improperly supported bricks below the straight lintel. It is recommended that a curved lintel be retrofitted in place to ensure the lintel is properly supported. Other minor cracks can be repaired with crack repair epoxy. The minor cracks shall be continuously monitored for further signs of deterioration. Additional repairs may be required if these cracks worsen. The poor drainage of the site may be causing excessive settlement in the foundation and site drainage shall be improved.

If you have any questions, please do not hesitate to contact us.

Sincerely,



Andrew F. Melchers, UE, M.Eng, P.Eng



Limitations

The contents of this report are based on the information obtained at the time of the review. IN Engineering has used its professional judgement to form opinions, recommendations and conclusions. IN Engineering has performed this review to the standards and best practices determined by the Professional Engineers of Ontario and the practice guideline *Structural Condition Assessments of Existing Buildings and Designed Structures Guideline*. No other warranty or representation is expressed or implied as to the accuracy of the information or recommendations included or intended in this report. This review was limited by a visual structural review only of visually exposed elements. No non-destructive testing nor analysis was performed. Any use of this report by a third party is not permitted. IN Engineering disclaims any liability or responsibility to any person or party for any loss, damage, expense, fine or penalty which may arise or result from the use of any information or recommendation contained in this report.

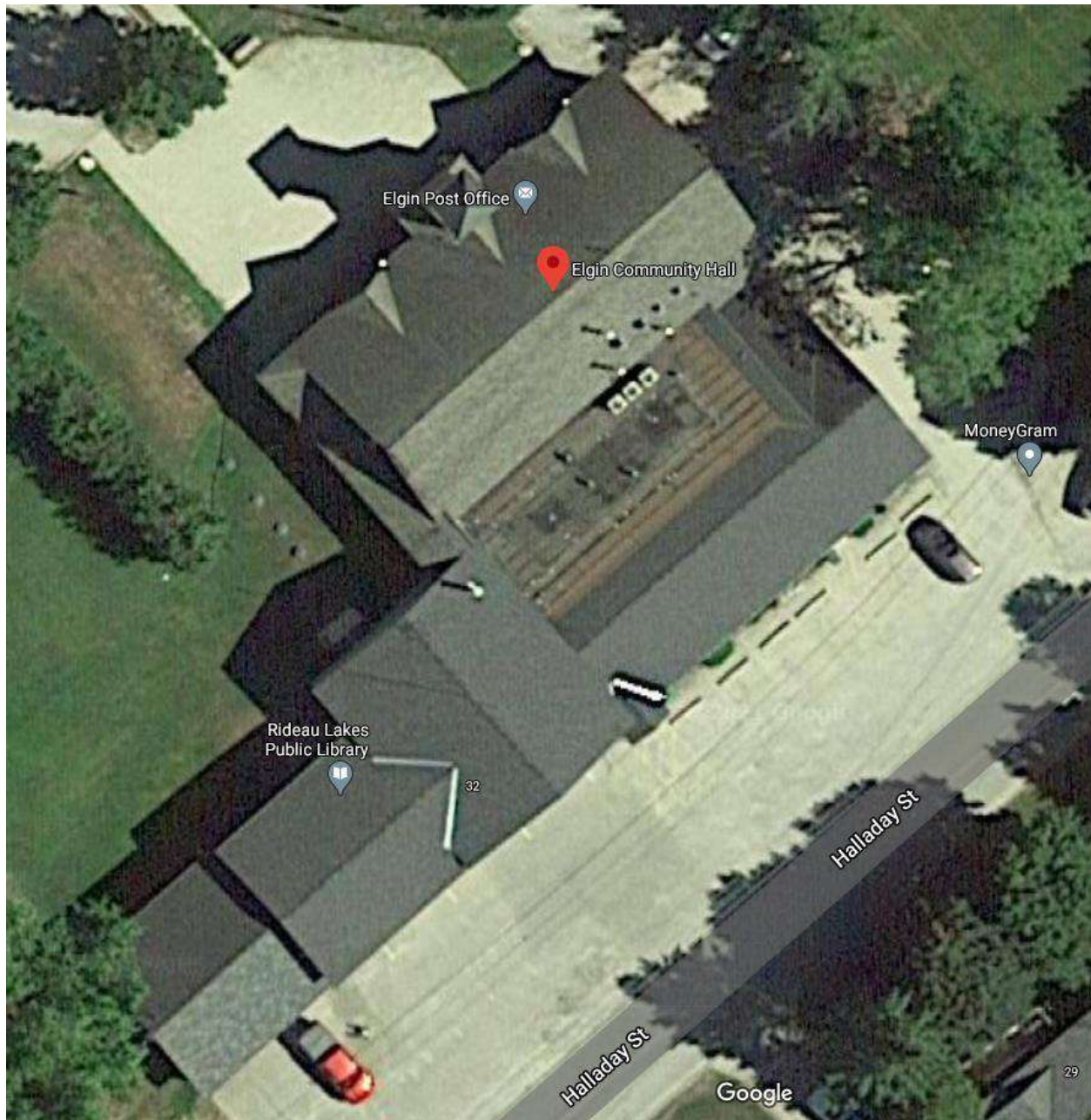


Figure 1: Satellite view of Elgin Municipal Centre



Figure 2: Overall view of tower.



Figure 3: Side view of tower.



Figure 4: Cracking at top of arch, indicative of improperly installed lintel.



Figure 5: Main arch at top.



Figure 6: Side arch from inside.

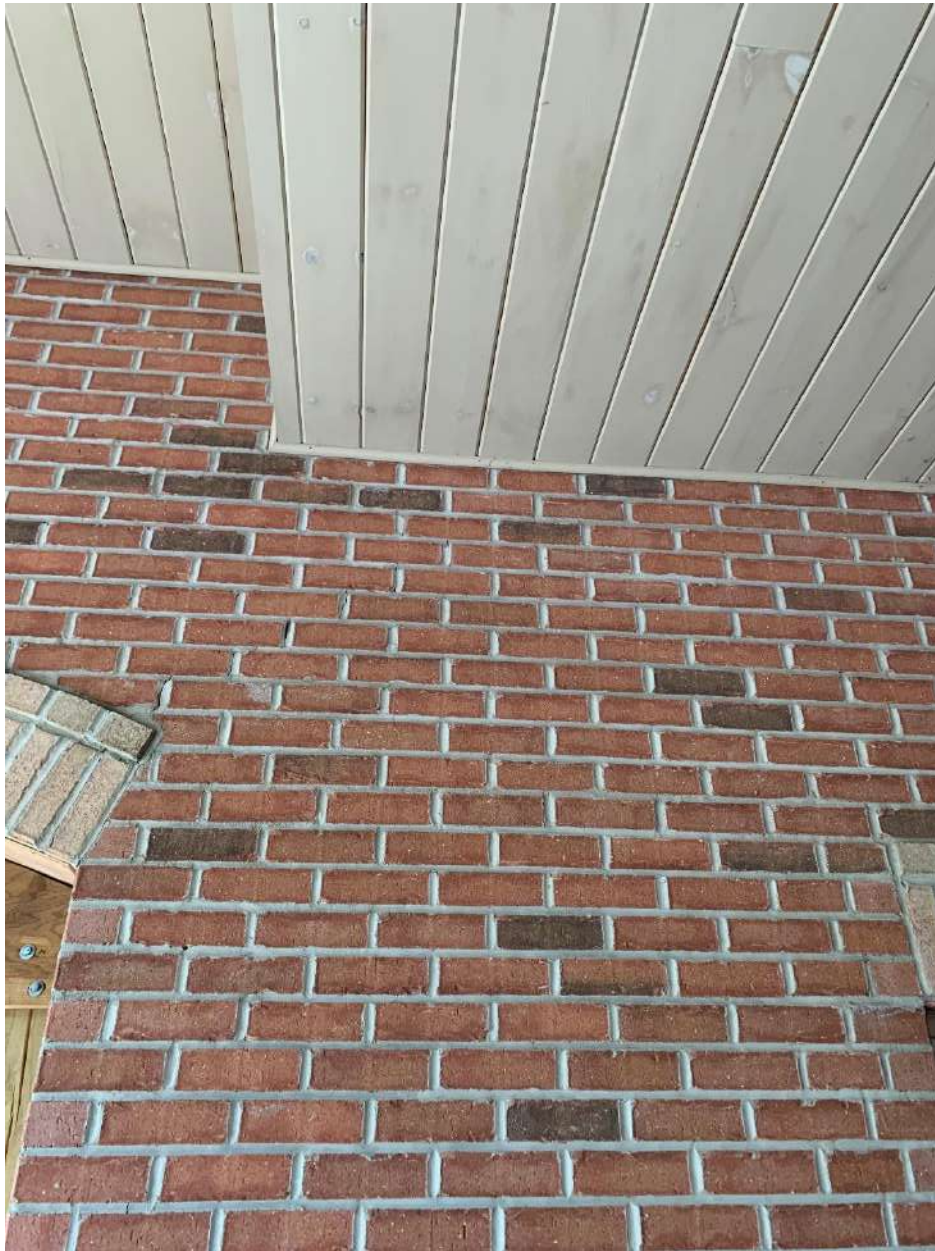


Figure 7: Cracks in mortar joint at side arch.



Figure 8: Thicker bed joint on side arch, indication an lintel at this location.



Figure 9: Cracking up to the underside of the assumed location of brick lintel.



Figure 10: Arch span.



Figure 11: Arch height.



Figure 12: Cracked mortar



Figure 13: Lintel failure at main arch.



Figure 14: Lintel failure at main arch.

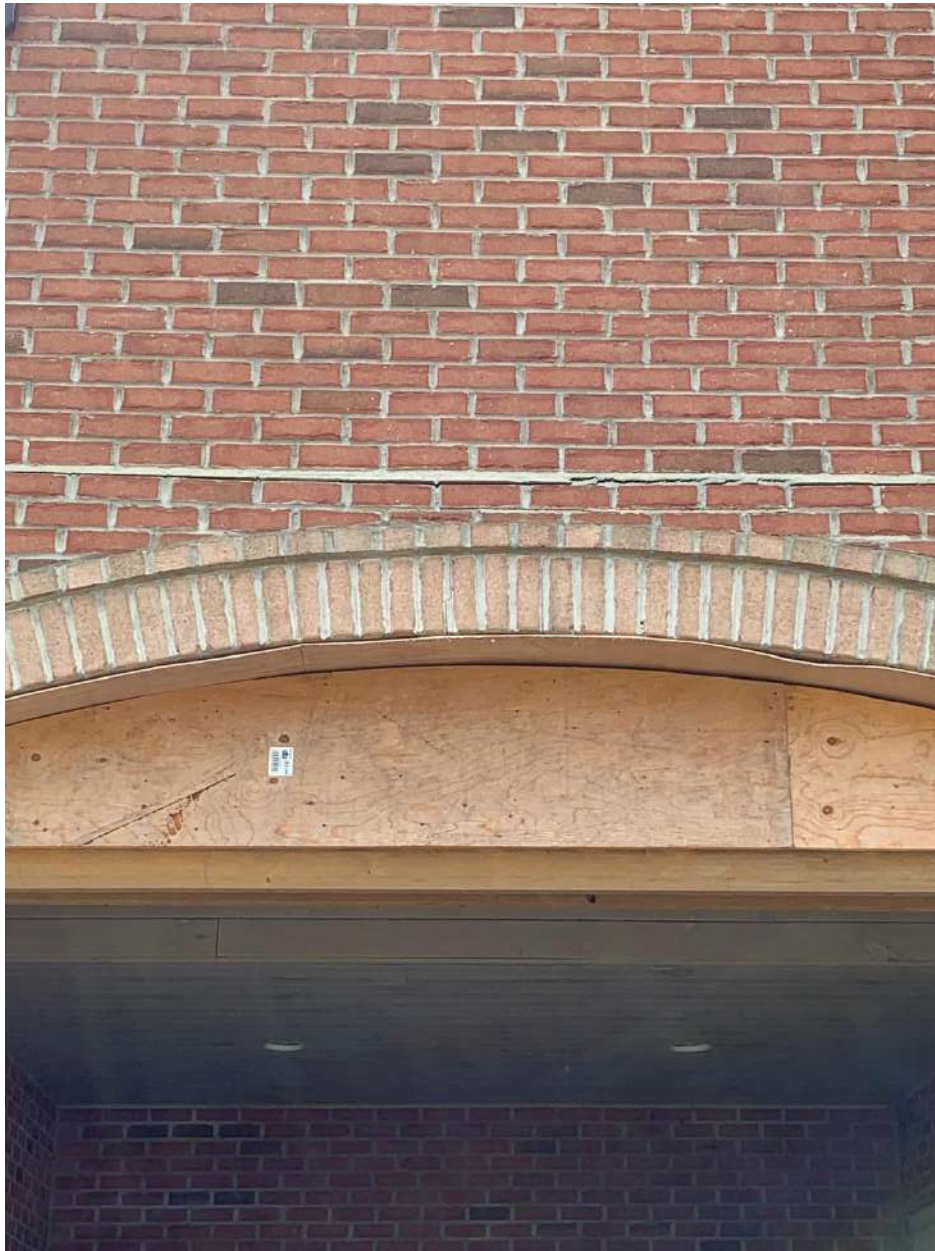


Figure 15: Thicker bed joint indicating unknown lintel.



Figure 16: Main arch.



Figure 17: Brick pier at base.



Figure 18: Cracks in brick pier and concrete pier.



Figure 19: Cracks in brick pier.



Figure 20: Minor cracks at arch.

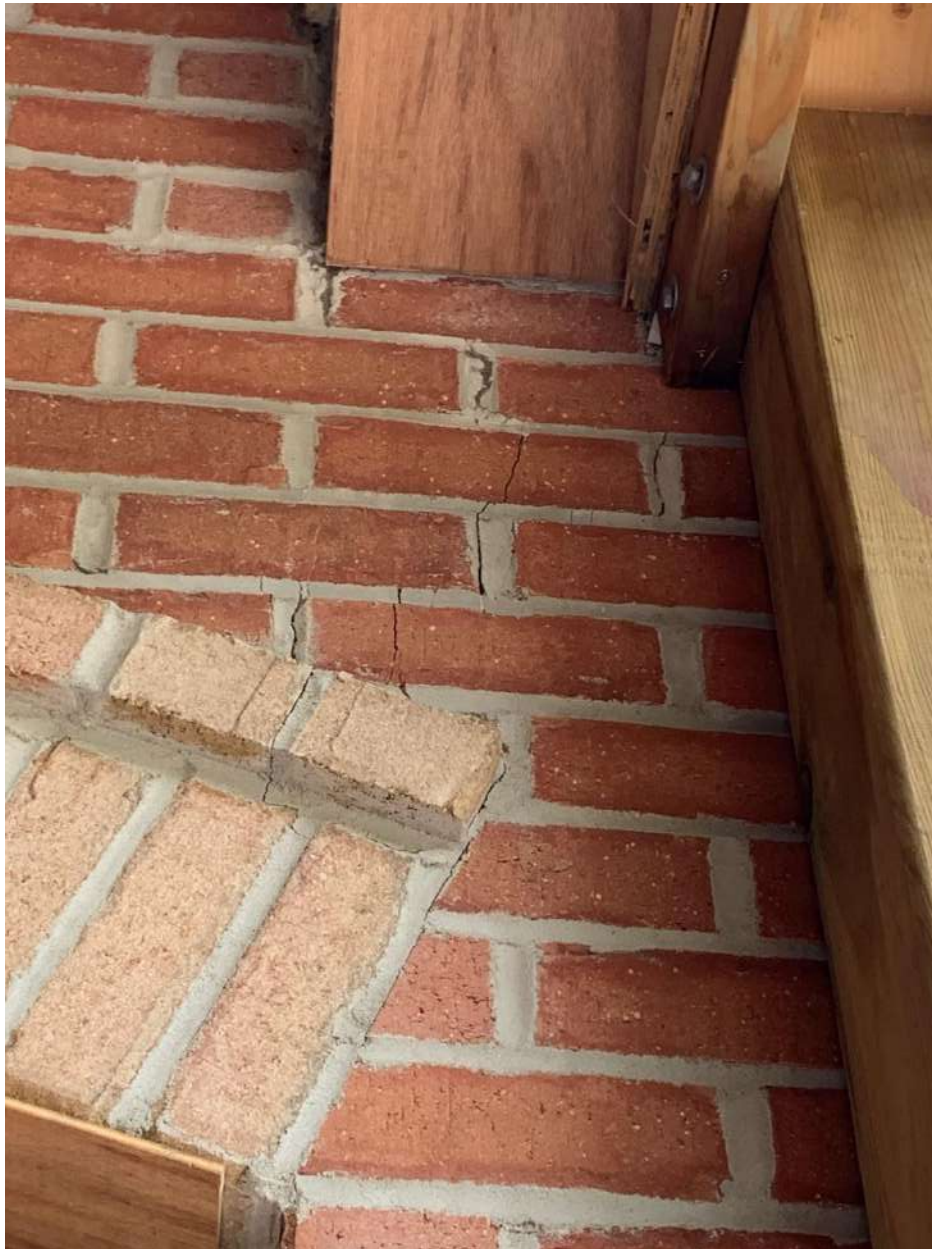


Figure 21: Cracks at arch due to expansion/contraction.



Figure 22: Side View.

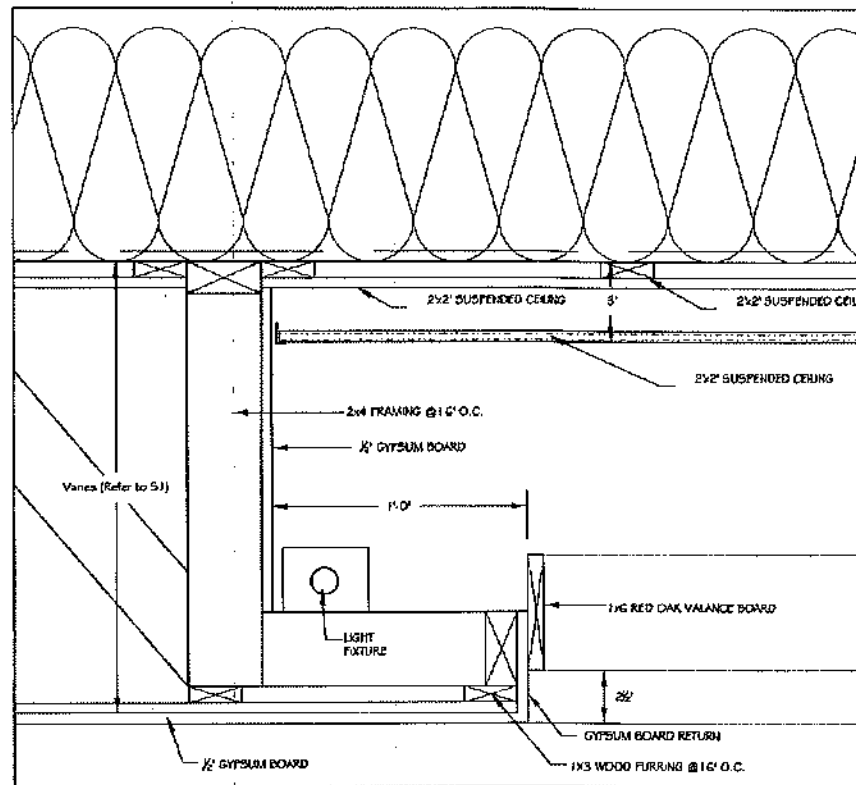


Larry Gaines
Architect

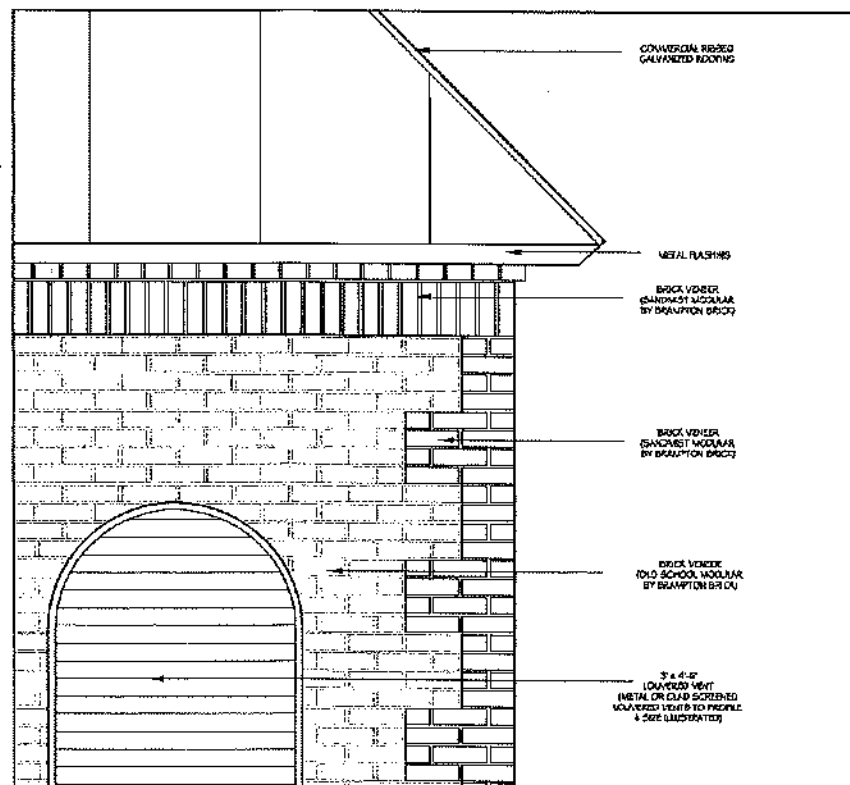
137 A Bridge Street
Caledonia Place, ON
N4C 2Y6
Tel: (613) 257-8095
Fax: (613) 257-4334
e-mail: gale@hybora.ca

General Notes:

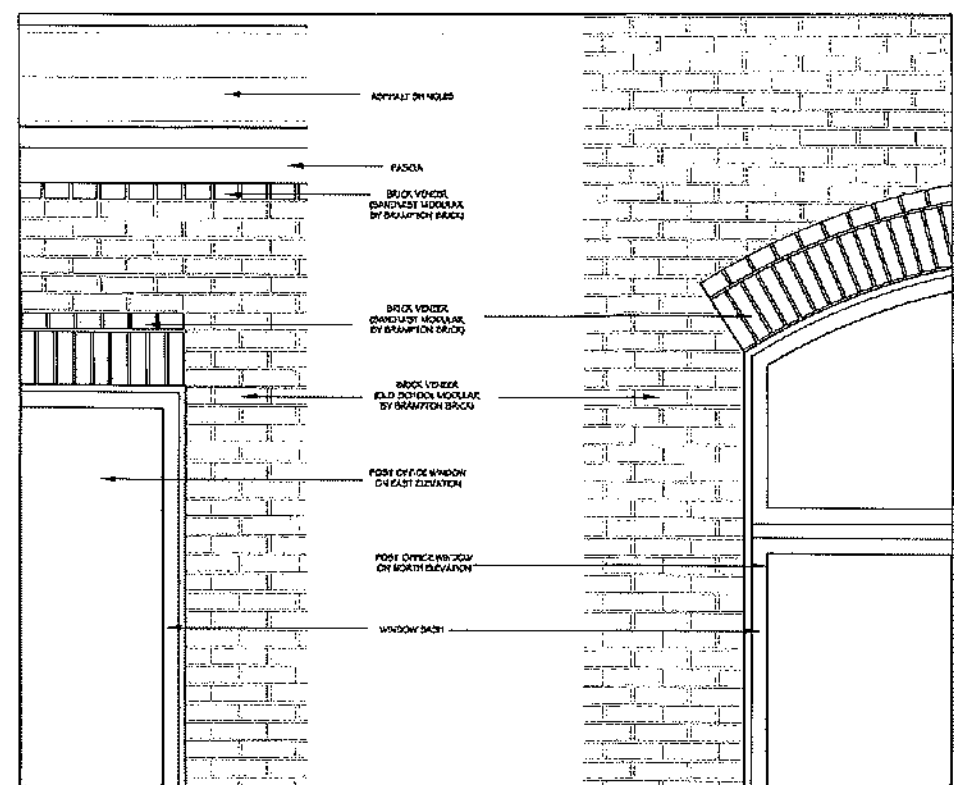
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2. All construction to conform to the Ontario Building Code (OBC) 1997 Edition.



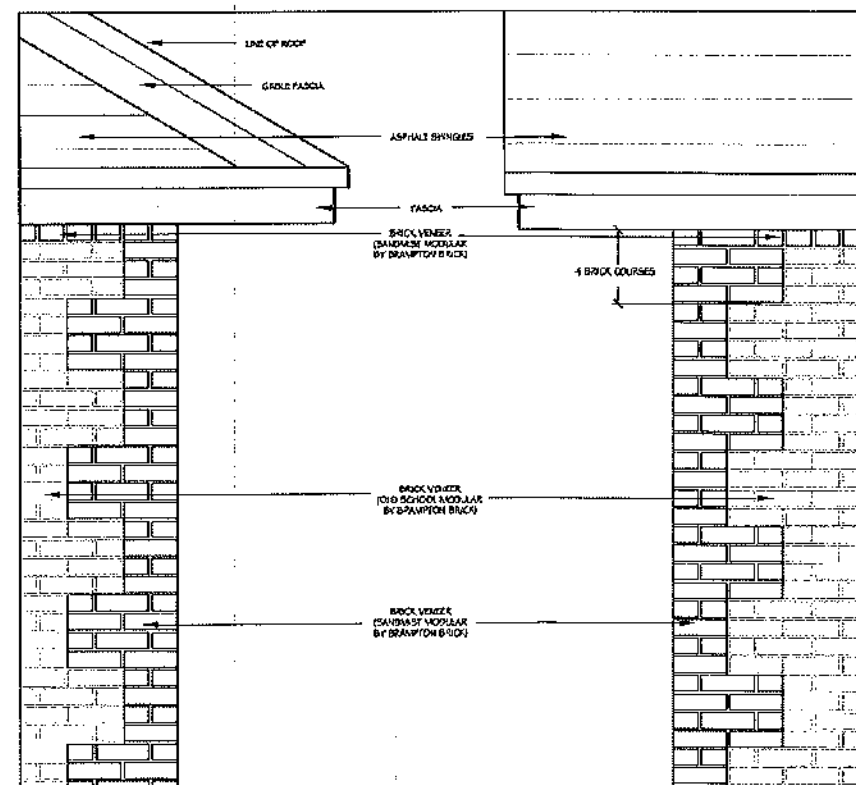
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VALANCE LIGHT DETAIL
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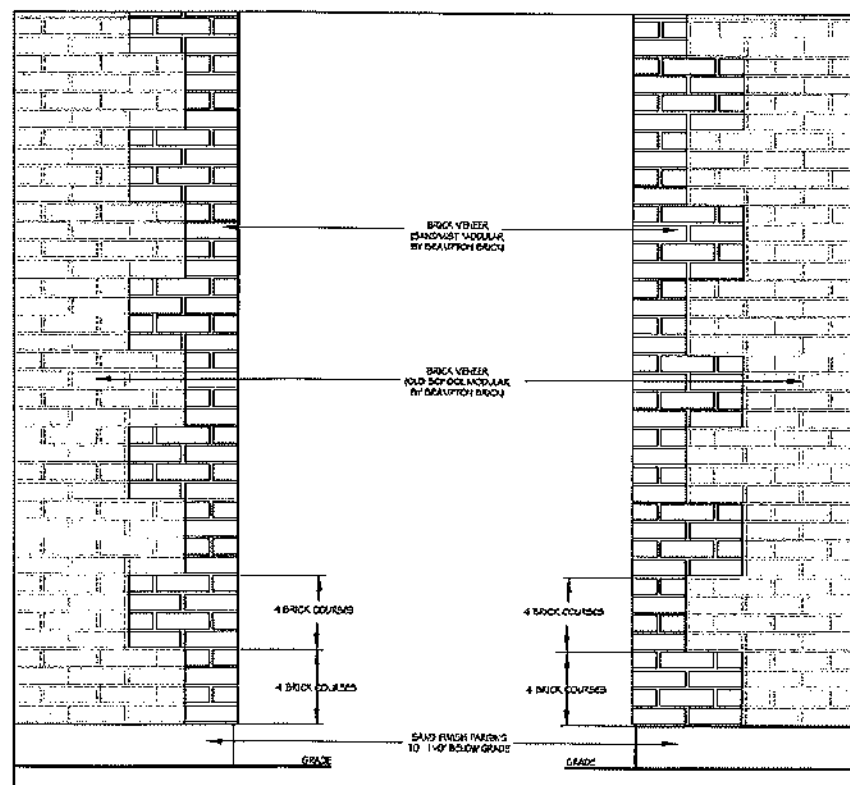
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A10
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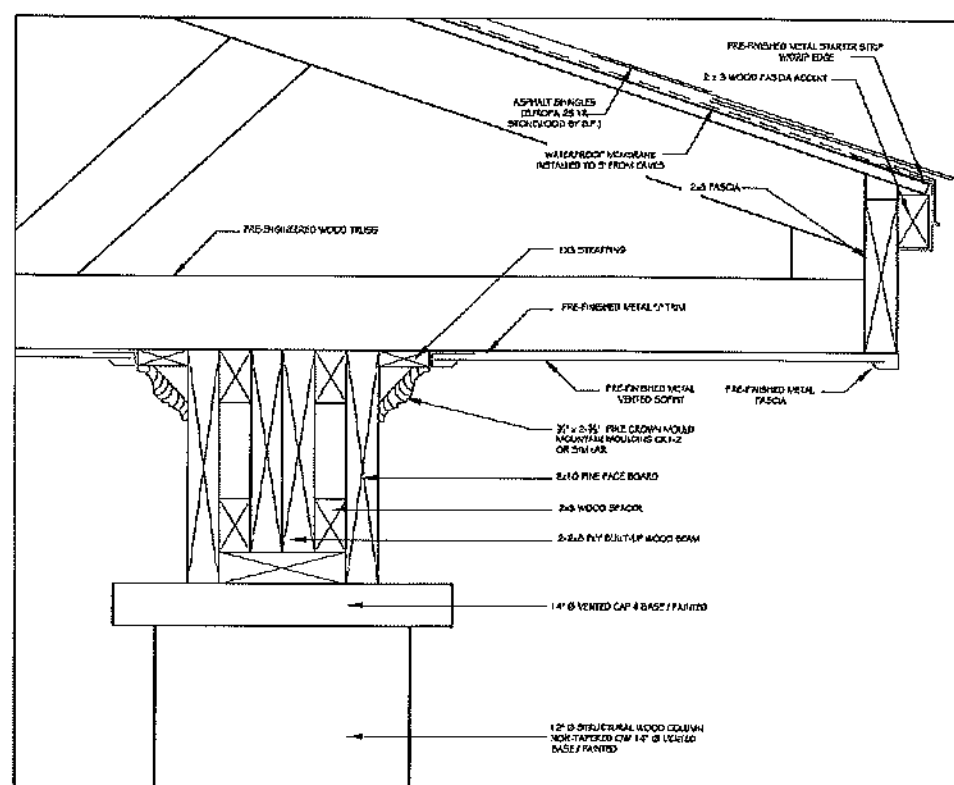
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A10
BRICK DETAIL OVER WINDOW TYP.
SCALE: 1\"/>



4
A10
BRICK DETAIL UNDER SOFFIT TYP.
SCALE: 1\"/>



5
A10
BRICK DETAIL AT CORNERS TYP.
SCALE: 1\"/>



6
A10
COLUMN CAP AND BEAM DETAIL
SCALE: 3/4\"/>

004 Tender 03/06/03
003 Preliminary Review 03/05/03
002 Elevs. & Plan 20/03/03
001 Library & Entrance 10/03/03

No. Date

Project Title

RIDEAU LAKES
Community Centre/
Post Office

ELGIN, ON.

Drawing Title

Misc. Details

Designed By: Larry Gaines

Drawn By: Stephen V. Garlick

Date: Jan 6, 2003

Scale: 1/8" = 1'

North Arrow



Sheet No.

A10



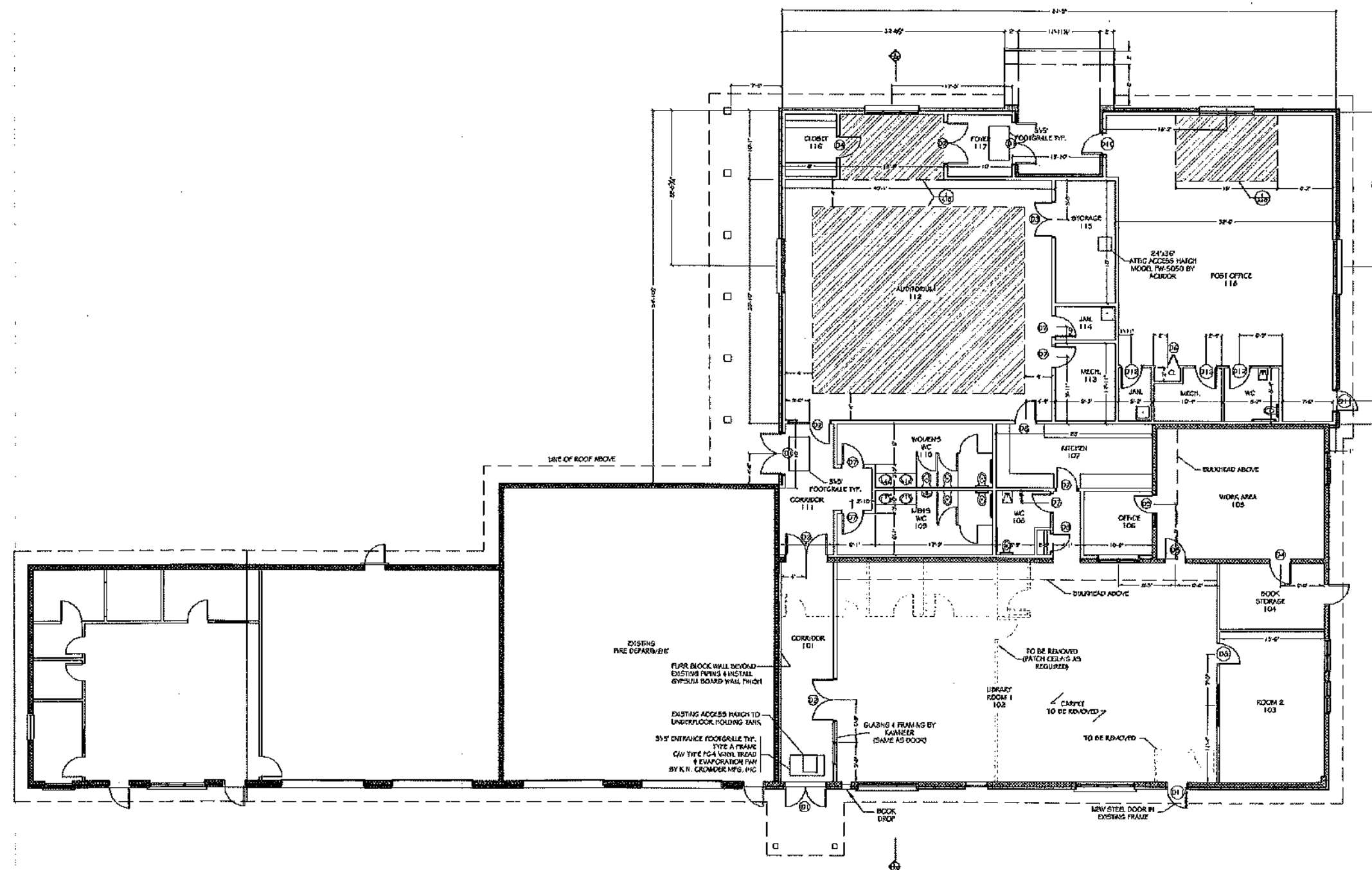
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General Notes:

1. Drawings are not to be scaled.
2. All construction to conform to the Ontario Building Code (OBC) 1997 Edition.



004 Tender 03/06/03
003 Prelim. Review 09/05/03
002 Elevs. & Plan 20/03/03
001 Library & Entrance 10/03/03

No. Date

Project Title

RIDEAU LAKES
Community Centre/
Post Office

ELGIN, ON.

Drawing Title

Floor
Plan

Designed By: Larry Gaines

Drawn By: Stephen V. Garlick

Date: Jan 6, 2003

Scale: 1/8" = 1'

North Arrow Sheet No.



A3



Larry Gaines
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General Notes:

1. Drawings are not to be scaled.
2. All construction to conform to the Ontario Building Code (OBC) 1997 Edition.

004	Tender	03/06/03
005	Prelim. Review	05/05/03
002	Devs. & Plan	20/03/03
001	Library & Entrance	10/03/03

No. Date

Project Title

RIDEAU LAKES
Community Centre/
Post Office

ELGIN, ON.

Drawing Title

North and South
Elevations

Designed By: Larry Gaines

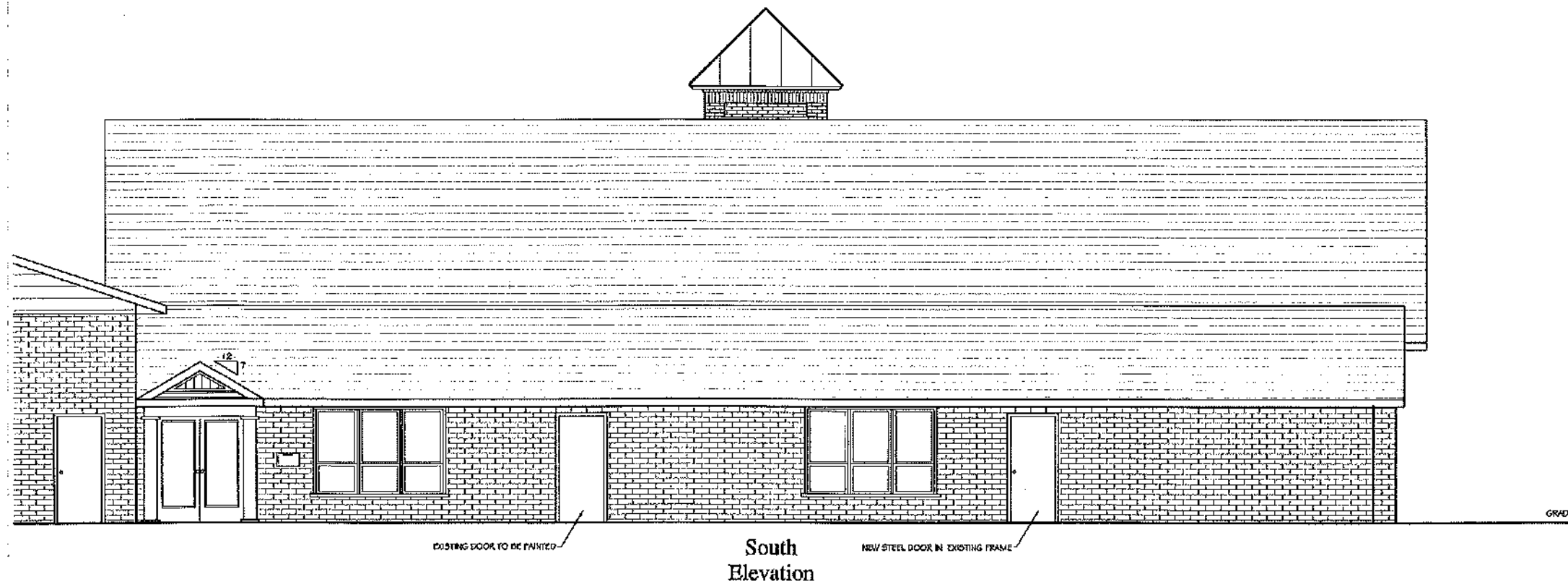
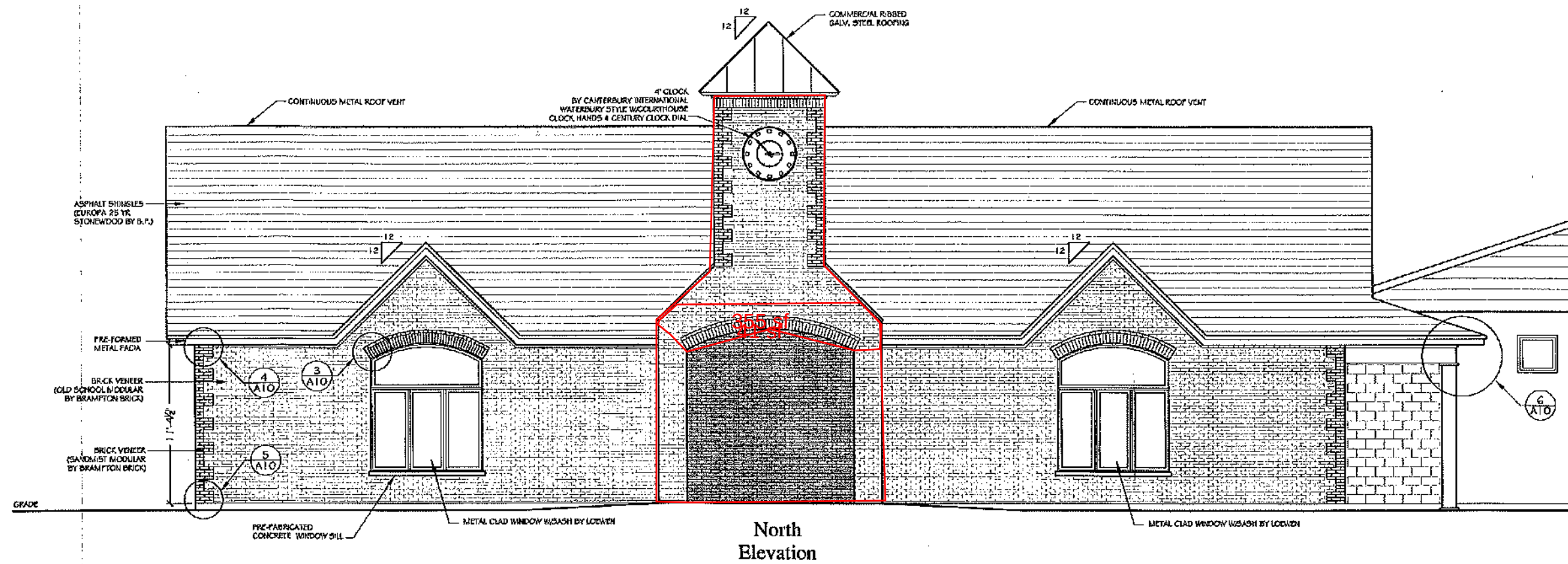
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Date: Jan 8, 2003

Scale: 1/4" = 1'

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A6

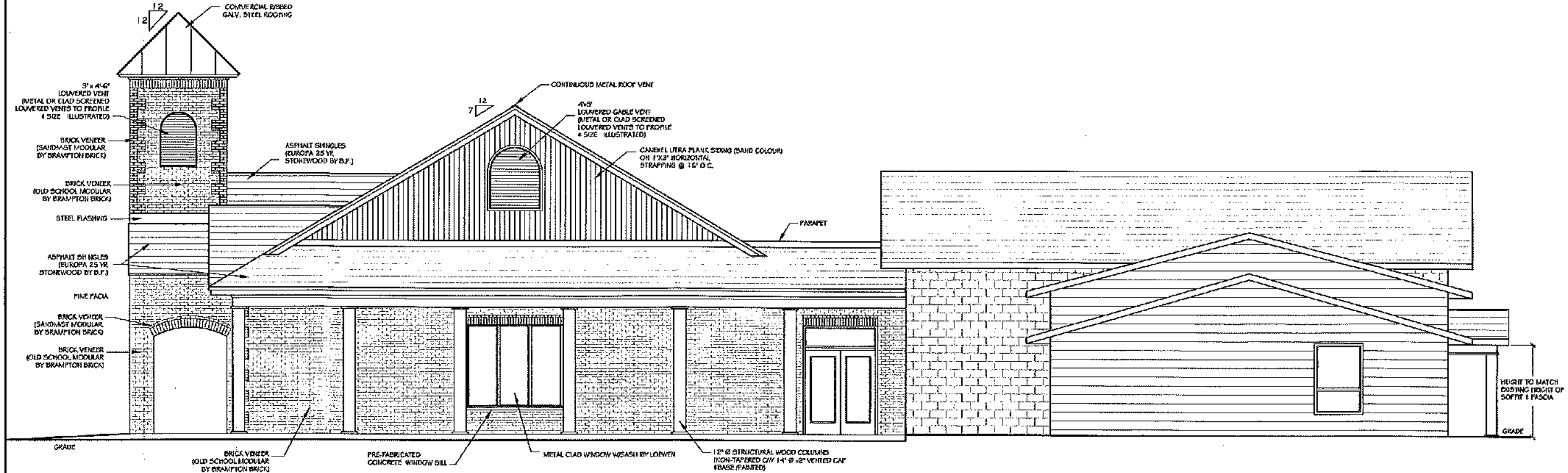




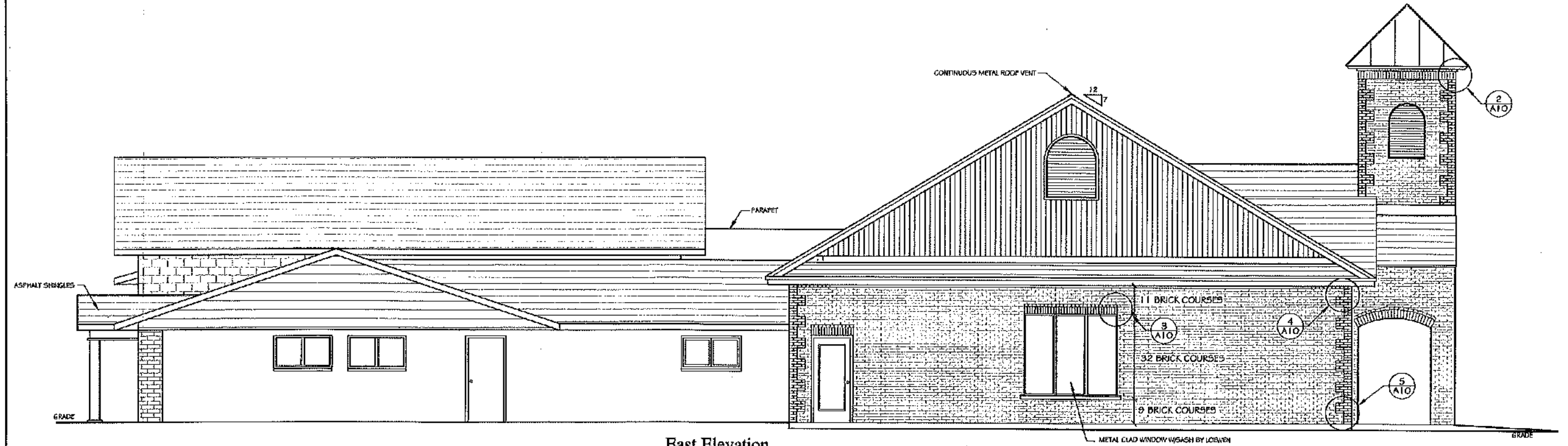
Larry Gaines
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- General Notes:
1. Drawings are not to be sealed.
 2. All construction to conform to the Ontario Building Code (OBC) 1997 Edition.



West Elevation



East Elevation

004 Tender	03/06/03
003 Prelim. Review	09/05/03
002 Elevs. & Plan	20/03/03
001 Library & Entrance	10/03/03
No.	Date

Project Title
**RIDEAU LAKES
Community Centre/
Post Office**

Location
ELGIN, ON.

Drawing Title
**East and West
Elevations**

Designed By: Larry Gaines
Drawn By: Stephen V. Garlick
Date: Jan 8, 2003
Scale: 1/8" = 1'
North Arrow

Sheet No.
A7

3
A9 NEW TYPICAL EXTERIOR WALL SECTION
SCALE: 1"=1'-0"



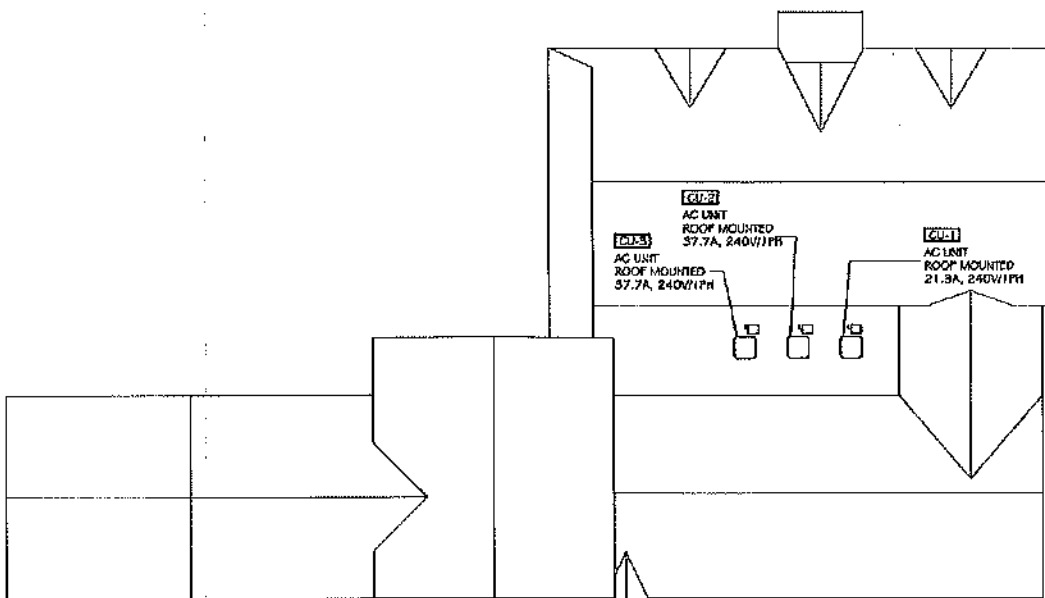
Larry Gaines
Architect

137 A Bridge Street
Orleans Place, ON
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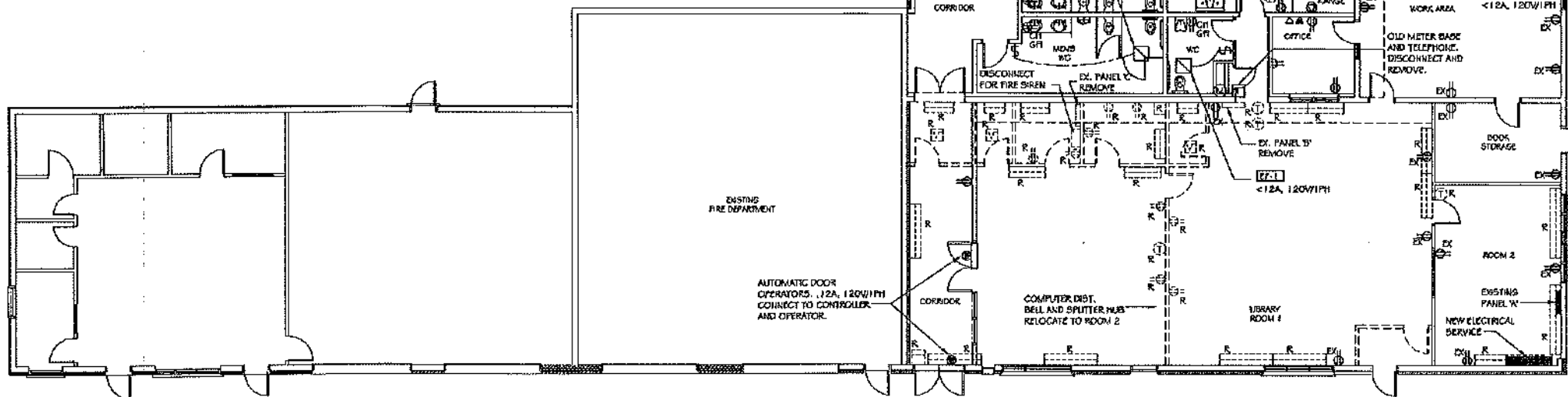
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e-mail: info@easterneng.ca



ROOF PLAN
SCALE: 1/16" = 1'-0"



POWER AND DISTRIBUTION
SCALE: 1/8" = 1'-0"

ELECTRICAL LEGEND

NOTES: HEIGHT IS FROM FINISHED FLOOR TO CENTRE LINE OF EQUIPMENT, UNLESS OTHERWISE NOTED	HEIGHT
ELECTRICAL DISTRIBUTION PANEL FLUSH MOUNTED	727/825mm (TOP)
ELECTRICAL DISTRIBUTION PANEL RECESSED	
DISCONNECT SWITCH	477/200mm
EQUIPMENT DISCONNECT SWITCH	477/200mm
NEW DUPLEX RECEPTACLE (WALL) - 15A/120V CH - COUNTER HEIGHT GF - GROUND FAULT PROTECT WP - WEATHER/PROOF	127300mm
EXISTING DUPLEX RECEPT. - RETAIN	
EXISTING DUPLEX RECEPT. - DISCONNECT & REMOVE RECEPT., WIRING, BOX & CONDUIT	
NEW DUPLEX RECEPTACLE, SPLIT - 15A/120V	
NEW DATA OUTLET (WALL) 3/4" CONDUIT FROM BACKBOX TO CEILING SPACE. ROUGH-IN ONLY.	127300mm
NEW TELEPHONE OUTLET (WALL) 3/4" CONDUIT FROM BACKBOX TO CEILING SPACE. ROUGH-IN ONLY.	127300mm
EXISTING EXHAUST FAN AND CONTROL - DISCONNECT AND REMOVE FAN, WIRING, BOX AND CONDUIT	
EXISTING ELECTRIC BASEBOARD HEATER - DISCONNECT AND REMOVE HEATER AND CONTROL, WIRING, BOX AND CONDUIT	
EXISTING THERMOSTAT - DISCONNECT AND REMOVE TSTAT WIRING, BOX AND CONDUIT	
NON-FUSED DISCONNECT SWITCH	
DIRECT EQUIPMENT CONNECTION AS NOTED	

1	FOR TENDER	JUNE 05/03
0	PRELIMINARY	
No.		Date

Project Title

RIDEAU LAKES

ELGIN, ON.

Drawing Title

Electrical
Power &
Distribution

Designed By: Matt Morris

Drawn By: Trevor Heuvel

Date: April, 2003

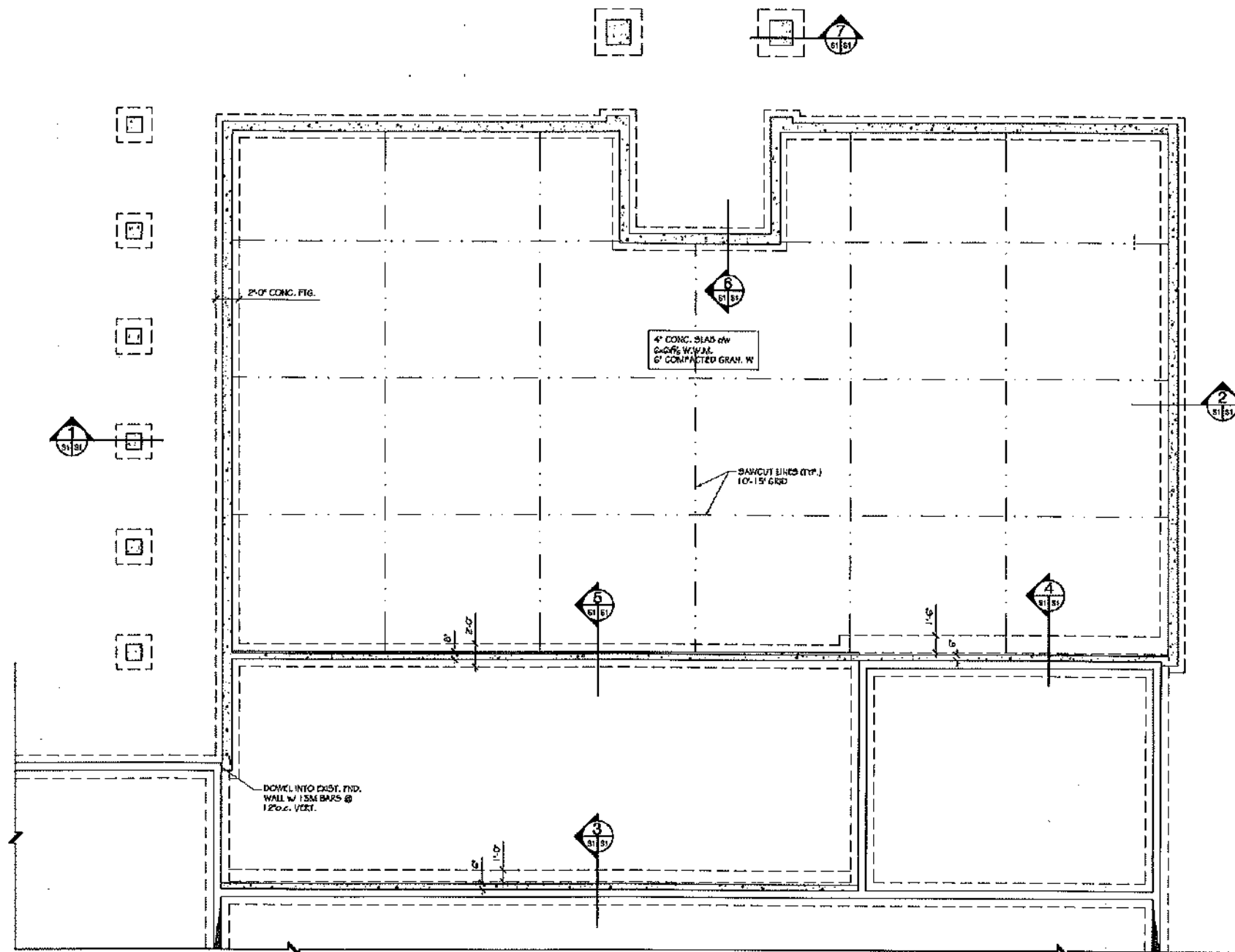
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North Arrow



Sheet No.

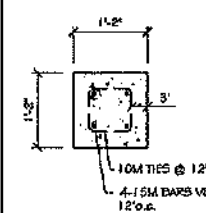
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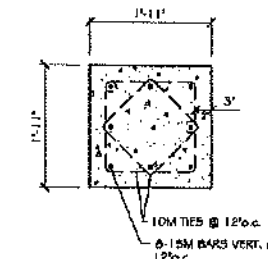
FOUNDATION PLAN
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NOTES:

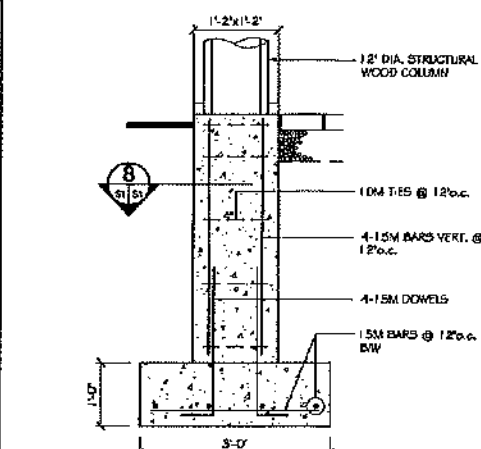
1. ALL WORK TO BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE ONTARIO BUILDING CODE.
2. CONCRETE FOOTINGS TO BE PUMPED AT 28 DAYS. CONCRETE WALLS TO BE 28MPa AT 28 DAYS W/ 6% AIR. AT TIME OF PLACING, SLUMP TO BE 3"±1/2". CONCRETE FOR FLOOR SLAB TO BE 25 MPa AT 28 DAYS.
3. CONCRETE WORK TO CAN A23.1 AND A23.3. 4. FOUNDATION WALLS TO HAVE 6% AIR AT TIME OF PLACING.
4. REINFORCING STEEL TO G30.5, $F_y=400\text{MPa}$.
5. ENGINEER TO INSPECT BOTTOM OF FOOTINGS AND PER FORMS PRIOR TO PLACING CONCRETE.
6. DESIGN BASE ON BEARING CAPACITY OF 2000kPa, 15.7.
7. CONTRACTOR TO VERIFY ALL DIMENSIONS.



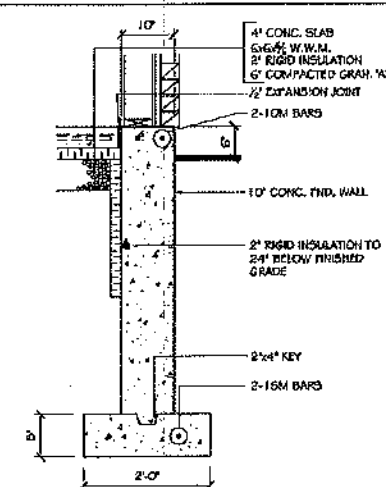
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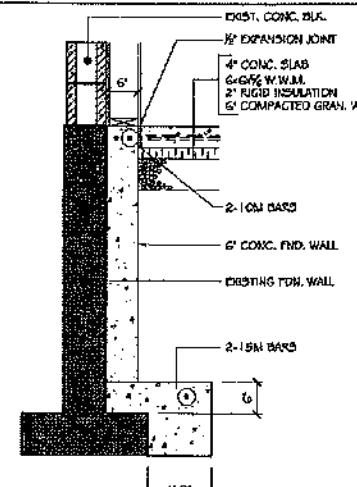
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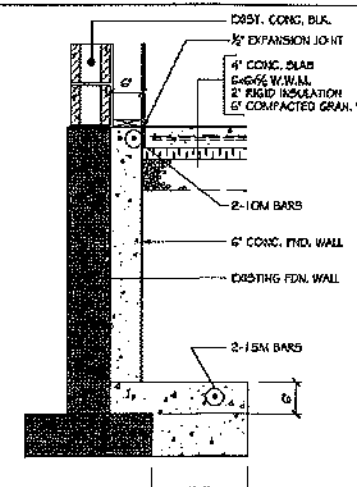
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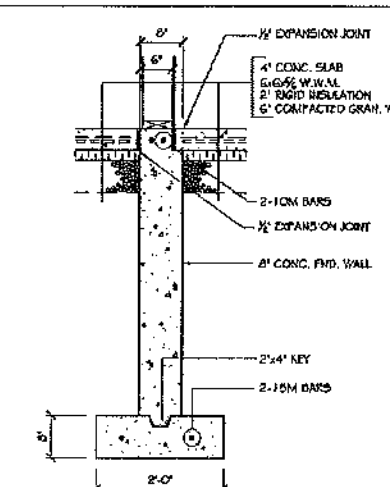
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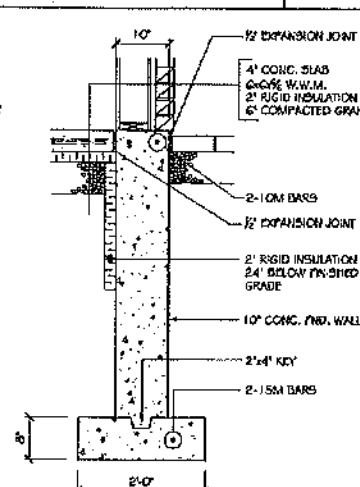
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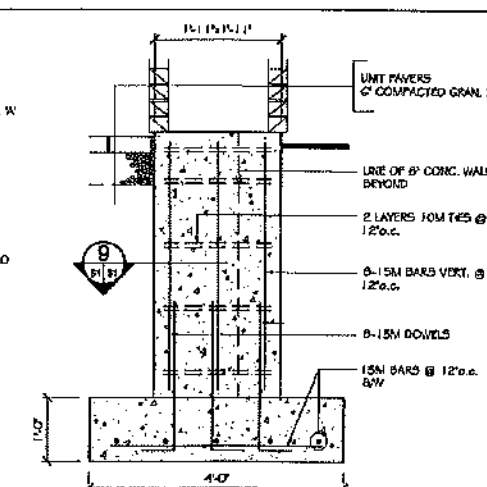
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SECTION 5
SCALE: 3/4" = 1'-0"



SECTION 6
SCALE: 3/4" = 1'-0"



SECTION 7
SCALE: 3/4" = 1'-0"



Larry Gaines
Architect

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E-Mail: astern@roymail.on.ca

No. _____ Date _____

Project Title

RIDEAU LAKES

ELGIN, ON.

Drawing Title

Proposed
Foundation Plan

Designed By: **Larry Fancy**

Drawn By: **Greg Ham**

Date: **April, 2003**

Scale: **1/8" = 1'-0"**

North Arrow Sheet No.



S1



Larry Gaines
Architect

137 A Bridge Street
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K7C 2V6

Tel: (513) 251-8085
Fax: (513) 257-4338
e-mail: gallas@kyb.net



NOTES:

1. ALL STEEL SHALL CONFORM TO CSA 440.21, ALL STEEL TO BE 44ksi W. 155 TO BE 50ksi.
2. STEEL TO BE FABRICATED AND ERECTED TO CANCSA 516.1.
3. BOLTS TO BE 3/4" DIAMETER A508 A325 BEARING BOLTS.
4. ALL WELDING TO BE WITH E6010X ELECTRODES TO CSA W59. ALL WELDING BY PERSONNEL AND COMPANIES LICENSED BY THE CANADIAN WELDING BUREAU CSW 47.1.
5. CONTRACTOR TO VERIFY ALL DIMENSIONS PRIOR TO START OF CONSTRUCTION.

No. _____ Date _____
Project Title _____

RIDEAU LAKES
ELGIN, ON.

Drawing Title
**Proposed
Structural Plan**

Designed By: Larry Fancy

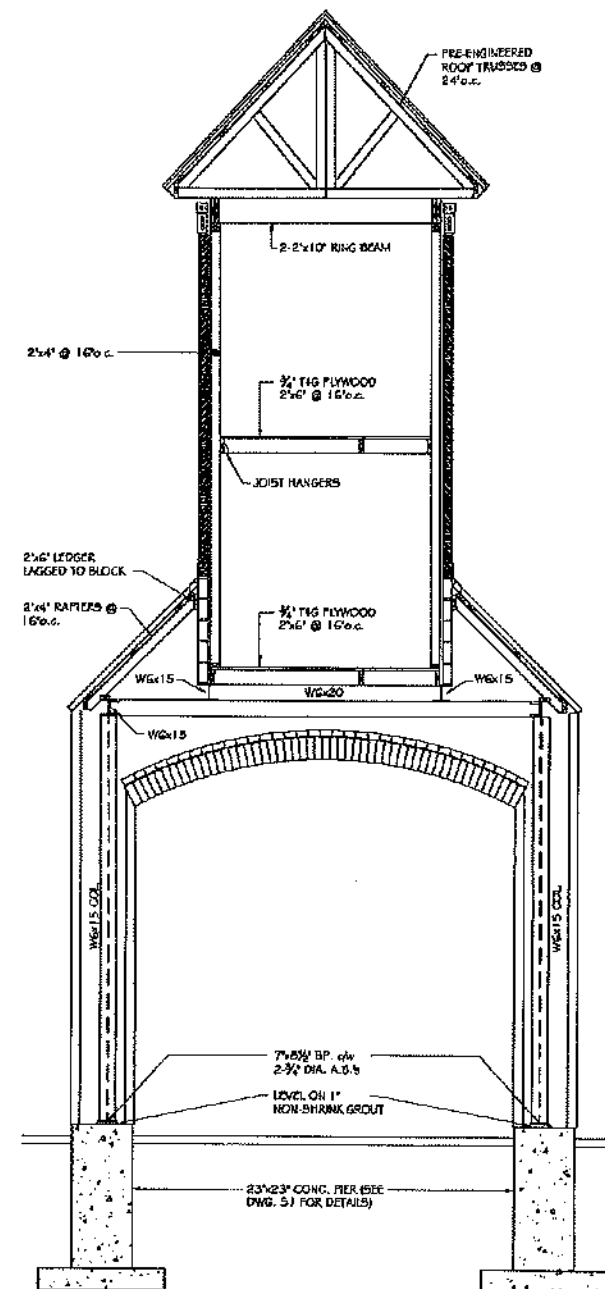
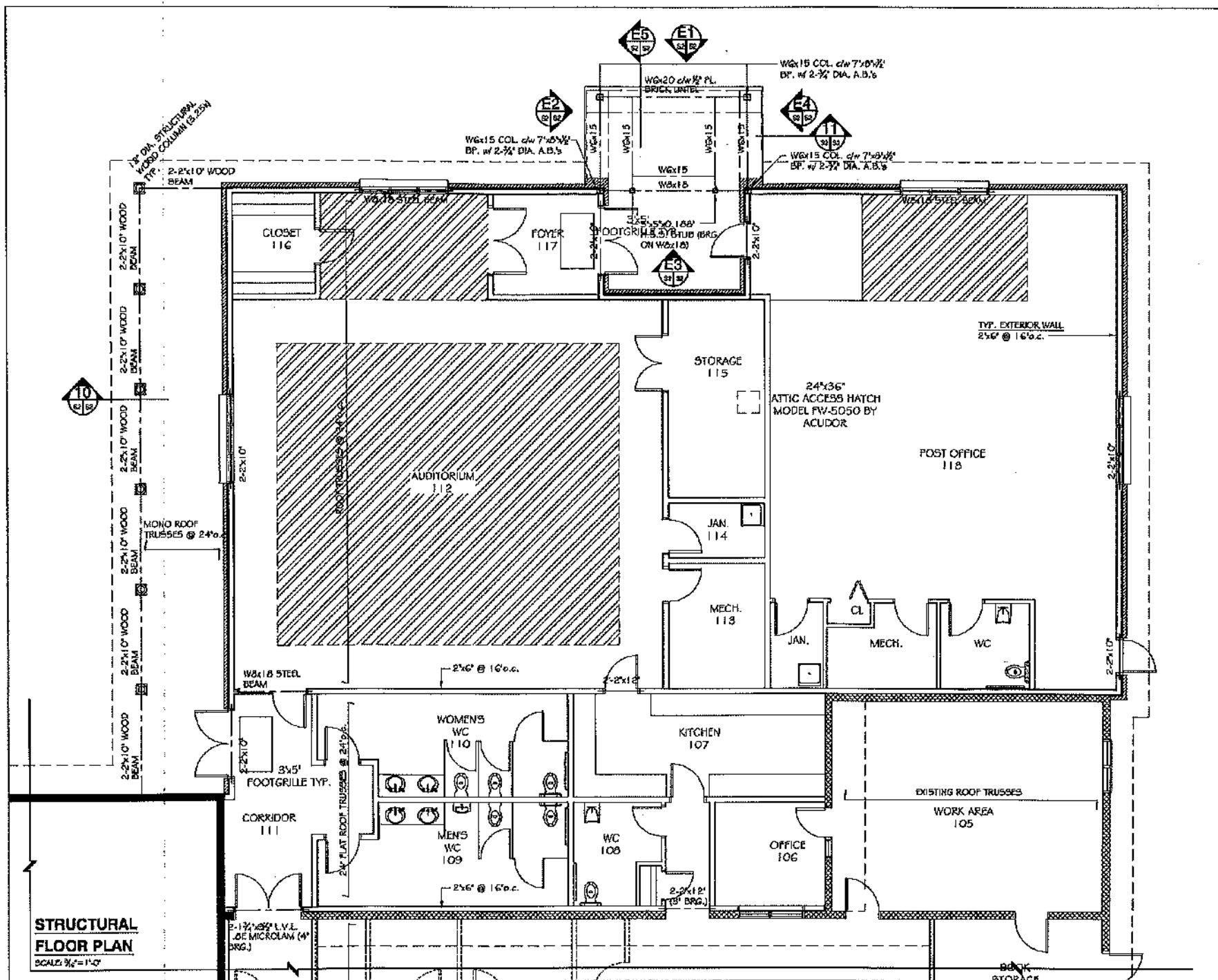
Drawn By: Greg Han

Date: April, 2003

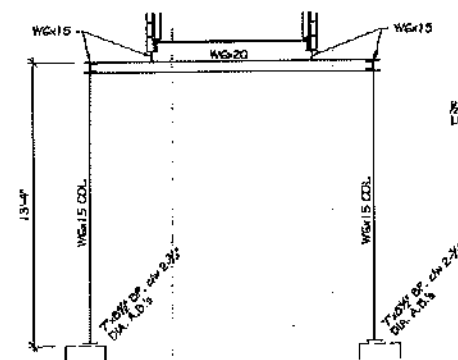
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North Arrow

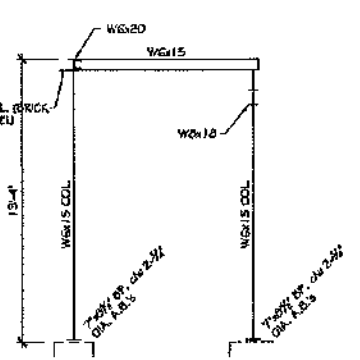
Sheet No.
S2



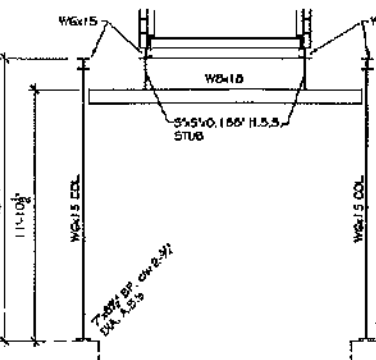
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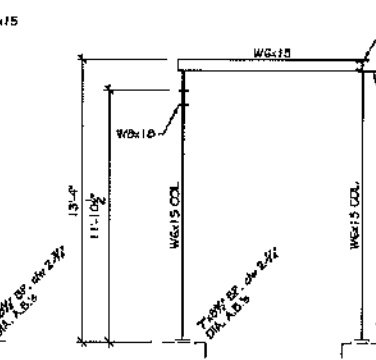
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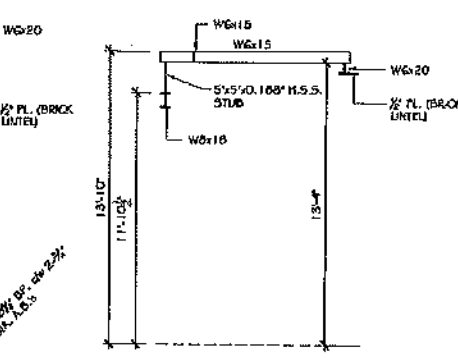
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STEEL ELEV. E3
SCALE: 1/8" = 1'-0"



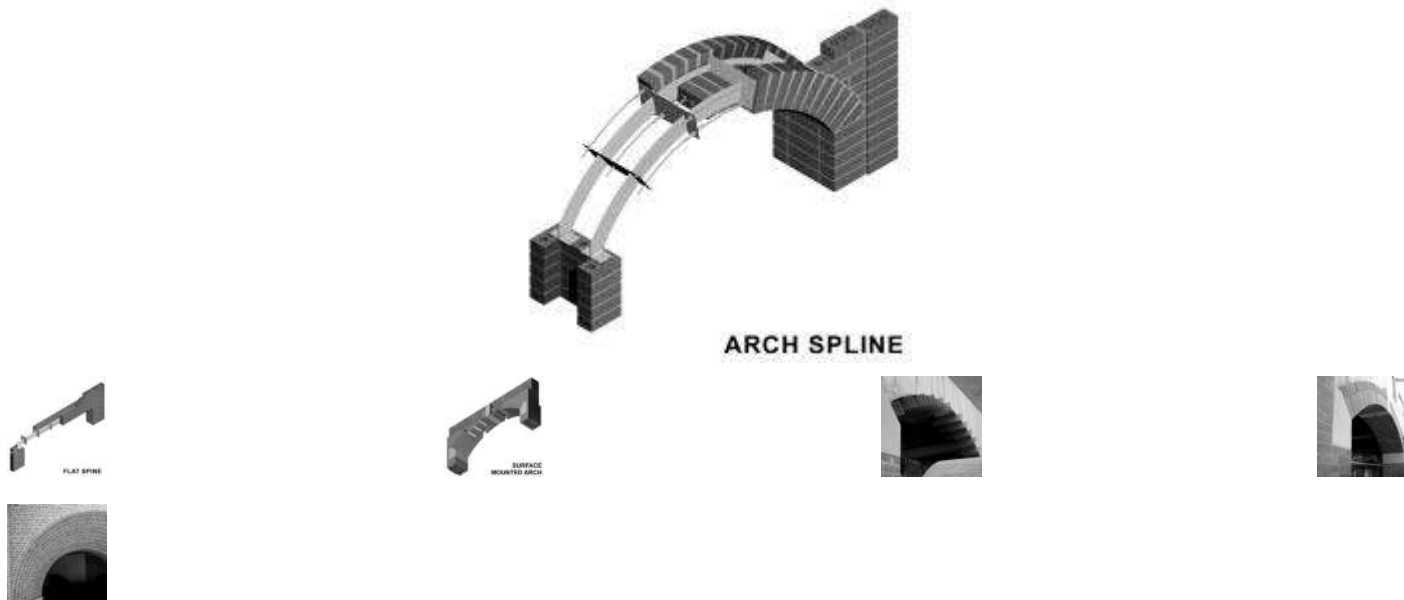
STEEL ELEV. E4
SCALE: 1/8" = 1'-0"



STEEL ELEV. E5
SCALE: 1/8" = 1'-0"

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 Concealed Lintel Systems Submittal

Specifications

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Safety Data Sheets (SDS)

MSDS Sheets are not available for this product
Contact Us to request information about this product.

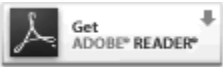
LEED

 Concealed Lintel Systems

 LEED - All H&B Products

CAD

CAD drawings for our Concealed Lintel Systems are developed based upon individual project requirements.
Contact Us to request more information.



Description

Details

Related

New! Designed and engineered concealed lintel systems for brickwork

Architects can feel free to incorporate this classic look into prestigious edifices such as Houses of Worship, Libraries, Universities, or wherever the design calls for a statement of timeless and imposing beauty. Virtually any design incorporating flat or arched brickwork can

be brought to fruition in conjunction with H&B's job-specific concealed lintel systems.

The opportunities for Architectural creativity are virtually limitless, the designer provides the vision and H&B will engineer and fabricate it.

- Hohmann & Barnard will provide all necessary drawings and calculations to achieve a look of remarkable beauty and durability
- Designs can incorporate varied coursings, spans, offsets, soffit widths, and even various sizes and colors of brick.
- H&B's lintel systems leave all steel supports unexposed, thus:
 - No future maintenance is required.
 - Nothing comes between the original architectural idea and the aesthetically pleasing end result.



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SECTION 040523.23 – CONCEALED LINTEL SYSTEM

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Revise this Section by adding, changing, and deleting text to meet Project-specific requirements.

DISCLAIMER:

Information contained in this specification conforms to standard detail and product recommendations for the installation of the specified products as of the date of publication of this document and is presented in good faith. Hohmann & Barnard and its affiliates assumes no liability, expressed or implied, as to the architecture, engineering or workmanship of any project. Visit our website at www.h-b.com or contact Hohmann & Barnard for the most current information.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Concealed lintel system and accessories.
 - 2. Steel plates, brackets, and anchors for placement in masonry work.
- B. Products Installed but not Furnished under This Section:
 - 1. Mortar and grout.
- C. Related Requirements:
 - 1. Division 04 Section for "Unit Masonry" for preparation of masonry supports to receive components in this Section.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **[Project site]** <**Insert location**>.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
 - 1. Indicate component profiles, sizes, and configurations.
 - 2. Show locations and details of anchors, connection attachments, size and type of fasteners, reinforcing, and accessories.
 - 3. Indicate welded connections using standard welding symbols. Indicate net weld lengths.
- C. Design Data: Submit manufacturer's design data and structural calculations, signed and sealed by qualified Professional Engineer.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For **[Installer]** **[and]** **[professional engineer]**.
- B. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in installing assemblies similar in material, design, and extent to that indicated for this Project, whose work has a record of successful in-service performance.
- B. Designer Qualifications: Professional Engineer experienced in design of assemblies similar to that required for this Project and licensed in the State in which the Project is located.
- C. Welding Qualifications: Qualify procedures and personnel according to **[AWS D1.1/D1.1M, "Structural Welding Code - Steel]** **[AWS D1.2/D1.2M, "Structural Welding Code - Aluminum]** **[AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel]** **[and]** **[AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel]."**
- D. Mockups: Build mockups to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockup of concealed lintel system **[as shown on Drawings]** **[as directed by Architect]**.
 - 2. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials on elevated platforms in a dry location. If units are not stored in an enclosed location, cover with waterproof sheeting, securely tied.
- B. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
- C. Deliver materials to Project site in original factory packaging labeled with manufacturer's name, product name and designation.

1.8 COORDINATION

- A. Coordinate installation of components that are to be embedded in concrete or masonry so as not to interfere with anchors or reinforcement.
- B. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Concealed Lintel System as manufactured by Hohmann & Barnard.
- B. Substitution Limitations: **[Not permitted.] [Comply with provisions of Division 01 Section for "SUBSTITUTION PROCEDURES."]**

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section for "Quality Requirements," to design concealed lintel assembly.
- B. Structural Performance: Concealed lintel assembly shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Wind Loads: As indicated.
- C. Seismic Performance: Concealed lintel assembly shall withstand the effects of earthquake motions determined according to [ASCE/SEI 7] <Insert requirement>.
 - 1. Component Importance Factor: [1.5] [1.0].
- D. Limit deflection in each assembly caused by indicated loads and thermal movements, acting singly or in combination with one another, to not more than [1/720] <Insert ratio> of assembly's clear span or the following, whichever is smaller:

1. 1/16 inch (1.5 mm), measured in plane of wall.
2. 1/4 inch (6 mm), measured perpendicular to wall.

- E. Corrosion and Staining Control: Prevent galvanic and other forms of corrosion as well as staining by isolating metals and other materials from direct contact with incompatible materials. Materials shall not stain exposed surfaces of stone and joint materials.

2.3 MATERIALS

- A. Fabricate components from hot-dip galvanized steel, ASTM A 36/A 36M for materials and ASTM A 123/A 123M for galvanizing.
- B. Fabricate anchors from stainless steel, ASTM A 240/A 240M or ASTM A 666, [Type 304] [Type 316]; temper as required to support loads imposed without exceeding allowable design stresses. Fabricate dowels and pins for anchors from stainless steel, ASTM A 276, [Type 304] [Type 316].

2.4 FABRICATION

- A. Fabricate components to comply with performance requirements with allowances for field adjustments.
- B. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Weld shop connections to comply with applicable provisions of AWS D1.1/D1.1M.
- E. Hot-dip galvanize after fabrication to comply with ASTM A 123/A 123M.

2.5 FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel hardware and with ASTM A 123/A 123M for other steel products.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. Verify dimensions, tolerances, and method of attachment to other work.

2. Verify that substrates are free of substances that impair mortar bond.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary bracing or shoring per manufacturer's written instructions and as required to conform with design loads.

3.3 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners as indicated in approved shop drawings where concealed lintel assembly is to be fastened to in-place construction.

B. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

3.4 CONCEALED LINTEL INSTALLATION

A. Anchor concealed lintel assembly to in-place construction complying with manufacturer's written instructions and approved shop drawings.

B. Install components level, plumb, and true to line.

C. Remove temporary bracing or shoring after mortar has reached design compressive strength after 28 days minimum.

3.5 INSTALLATION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces of walls, do not exceed **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or **3/8 inch in 40 feet (10 mm in 12 m)** or more.

B. Variation from Level: For lintels, do not exceed **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or **3/8 inch (10 mm)** maximum.

3.6 ADJUSTING AND CLEANING

- A. Replace damaged or defective work, complying with other requirements, and showing no evidence of replacement.
- B. Final Cleaning: Clean masonry no fewer than six days after completion of work, using clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents containing caustic compounds or abrasives, or other materials or methods that could damage masonry.

END OF SECTION 040523.23



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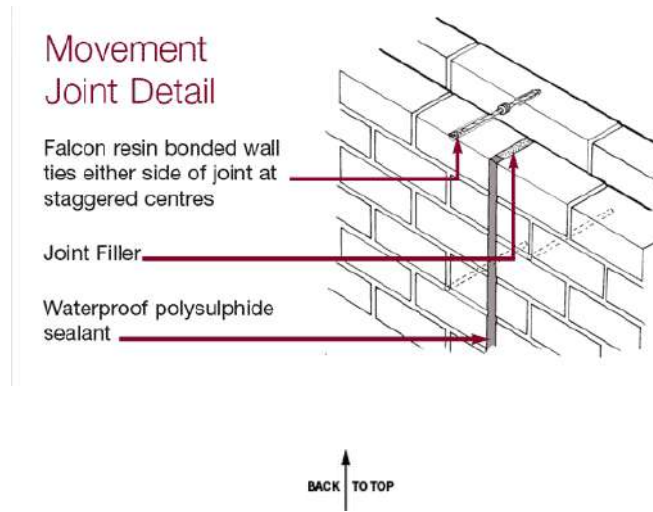
RETROFIT MOVEMENT JOINTS

Cracking due to thermal expansion and contraction of brickwork is a common problem in buildings originally constructed with no movement joints. Falcon form movement joints at strategic locations to control the effects of expansion and contraction whilst providing an aesthetically pleasing appearance. Joints are neatly finished with waterproof polysulphide sealants and are often concealed behind downpipes to reduce the visual impact.

Resin bonded or mechanical cavity ties are first installed on either side of the proposed joint at regular intervals in order to ensure that adequate lateral restraint of the brickwork is maintained. Temporary guide strips are secured to the wall to ensure that a true vertical line is achieved while cutting the joint. The joint is then formed using a diamond disc cutter with a vacuum fitting to reduce the dust generated. The brickwork is cut to the full depth of the external skin and a suitable joint filler such as expanded polyethylene foam is then inserted. A bond-breaking strip is placed over the joint filler, and the external face of the joint is finally sealed using an external grade polysulphide sealant of the appropriate composition for the width of joint and colour for the surrounding brickwork/pointing.



1. Cracking resulting from thermal expansion and contraction
2. Cavity tie installation to restrain brickwork
3. With expanded polyethylene foam filler
4. Priming prior to installing sealant
5. Application of sealant
6. Finished movement joint



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28 May 2021