

## GENERAL NOTES

- STRUCTURAL DESIGN BASED ON THE MANITOBA BUILDING CODE 2011 EDITION.
  - IMPORTANCE CATEGORY: NORMAL
  - WIND LOAD:  $q_{50} = 0.45 \text{ kPa}$
  - GROUND SNOW LOAD:  $S_g = 1.9 \text{ kPa}$
  - ASSOCIATED WIND LOAD:  $S_w = 0.2 \text{ kPa}$
- DO NOT SCALE DRAWINGS.
- DO NOT BACKFILL UNTIL GROUND FLOOR STRUCTURE IS IN PLACE AND BASEMENT SLABS HAVE BEEN POURED AND CURED.
- ALL DIMENSIONS ARE TO BE VERIFIED WITH THE ARCHITECTURAL DRAWINGS PROJECT DRAWINGS AND EXISTING SITE CONDITIONS PRIOR TO CONSTRUCTION.
- THESE STRUCTURAL DRAWINGS SHOW THE COMPLETED STRUCTURE AND DO NOT INDICATE ALL COMPONENTS NECESSARY FOR SAFETY DURING CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SAFETY ON AND AROUND THE JOBSITE DURING CONSTRUCTION.

### FOUNDATIONS

- A COPY OF THE GEOTECHNICAL REPORT COMMISSIONED BY THE OWNER IS AVAILABLE FOR REVIEW AT THE OFFICES OF THE CONSULTANT.
- NOTWITHSTANDING THE INFORMATION PROVIDED IN THE GEOTECHNICAL REPORT THE FOUNDATION AND GENERAL CONTRACTORS SHALL SATISFY THEMSELVES AS TO THE PREVAILING CONDITIONS AT THE SITE AS NO EXTRAS SHALL BE GRANTED SHOULD CONDITIONS DIFFER FROM THOSE INDICATED.
- ALL FRICION PILES ARE DESIGNED ON AN ALLOWABLE SKIN FRICTION OF 14.4 kPa. EFFECTIVE LENGTH OF FRICION PILES IS TOTAL LENGTH AS SHOWN ON PLAN MINUS 3000 mm FOR PERIMETER AND EXTERIOR PILES AND MINUS 1500 mm FOR INTERIOR PILES BELOW BASEMENT.
- FRICION PILE REINFORCING TO BE 8000 mm LONG UNLESS NOTED IN PLANS; 10M RINGS AT 1200 mm ON-CENTRE AND 3-10M RINGS AT 150 mm ON-CENTRE AT TOP. EXTEND VERTICAL PILE REINFORCING 450 mm INTO BEAMS OR WALLS. PILE REINFORCING TO BE 5-10M FOR 400 DIAMETER PILES, 6-10M FOR 450 mm, 5-15M FOR 500 mm, 5-15M FOR 550 mm, 6-15M FOR 600 mm.
- PROVIDE 10 MIL POLYETHYLENE WRAPPED SONOTUBE PLASTIC TUBE, GREASED COMPLETELY ON INSIDE FOR TOP 1800 mm OF PILES INDICATED ON PLAN.

### CAST-IN-PLACE CONCRETE

#### 1 CONCRETE

- ALL CONCRETE IS TO BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF CSA-A23.1-14 "CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION" AND CSA-A23.2-14 "METHOD OF TEST FOR CONCRETE".
- PROVIDE CERTIFICATION THAT MIX PROPORTIONS SELECTED WILL PRODUCE CONCRETE OF QUALITY, YIELD AND STRENGTH AS SPECIFIED IN CONCRETE MIXES, AND WILL COMPLY WITH CSA-A23.1. CERTIFICATION LETTER TO BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA.
- PROVIDE CERTIFICATION THAT PLANT, EQUIPMENT, AND MATERIALS TO BE USED IN CONCRETE COMPLY WITH REQUIREMENTS OF CSA-A23.1. CERTIFICATION LETTER TO BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA.
- CONCRETE PROPERTIES SHALL BE AS FOLLOWS UNLESS NOTED OTHERWISE ON THE DRAWINGS.

#### PILES:

32 MPa MIN. AT 56 DAYS  
CLASS OF EXPOSURE: S-2  
ENTRAINED AIR/CATEGORY: 2 (4% TO 7%)  
CEMENT TYPE: IS  
AGGREGATE MAX. 20 mm  
CURING TYPE: TYPE 1 - BASIC  
SLUMP: MIN. 120 mm

EXTERIOR WALLS AND GRADE BEAMS: 30 MPa MIN. AT 28 DAYS  
CLASS OF EXPOSURE: F-2  
ENTRAINED AIR/CATEGORY: 2 (4% TO 7%)  
AGGREGATE MAX. 20 mm  
CURING TYPE: TYPE 2 - ADDITIONAL

INTERIOR SLABS-ON-GRADE: 25 MPa MIN. AT 28 DAYS  
CLASS OF EXPOSURE: N  
ENTRAINED AIR/CATEGORY: NONE  
AGGREGATE MAX. 20 mm  
CURING TYPE: TYPE 2 - ADDITIONAL

INTERIOR STRUCTURAL SLABS: 25 MPa MIN. AT 28 DAYS  
CLASS OF EXPOSURE: N  
ENTRAINED AIR/CATEGORY: NONE (LESS THAN 3%)  
AGGREGATE MAX. 20 mm  
CURING TYPE: TYPE 2 - ADDITIONAL

UNLESS INDICATED OTHERWISE THE CONTRACTOR SHALL SPECIFY CONCRETE SLUMP APPROPRIATE WITH PLACEMENT METHODS AND SITE CONDITIONS. THE CONTRACTOR SPECIFIED SLUMP MUST BE SHOWN ON THE CERTIFICATION LETTER AND CONCRETE DELIVERY TICKET.

- UNLESS NOTED OTHERWISE CONCRETE CURING TO CONFORM TO THE LATEST EDITION OF CSA-A23.1-14 AS FOLLOWS:
  - TYPE 1 - BASIC: 3 DAYS  $\geq 10^\circ\text{C}$  AND FOR A TIME NECESSARY TO ATTAIN 40% OF THE SPECIFIED STRENGTH.
  - TYPE 2 - ADDITIONAL: 7 DAYS  $\geq 10^\circ\text{C}$  AND FOR A TIME NECESSARY TO ATTAIN 70% OF THE SPECIFIED STRENGTH.
  - TYPE 3 - EXTENDED: 7 DAYS WET CURING  $\geq 10^\circ\text{C}$ .

- AR ENTRAINING ADMIXTURES SHALL CONFORM TO THE REQUIREMENTS OF ASTM C260/C260M-10a "STANDARD SPECIFICATION FOR AIR ENTRAINING ADMIXTURES FOR CONCRETE". SUPERPLASTICIZING ADMIXTURES SHALL CONFORM TO ASTM C494/C494M "STANDARD SPECIFICATION FOR CHEMICAL ADMIXTURES FOR CONCRETE" OR ASTM C1017/C1017M "STANDARD SPECIFICATION FOR CHEMICAL ADMIXTURES FOR USE IN PRODUCING FLOWING CONCRETE" WHEN FLOWING CONCRETE IS APPLICABLE. AIR ENTRAINING ADMIXTURES TO HAVE A DURABILITY FACTOR GREATER THAN 75, WHEN TESTED TO ASTM STANDARDS C684/C684M PROCEDURE A. SPACING FACTOR FOR ANY AIR ENTRAINING ADMIXTURE MUST BE 0.17mm OR LESS WHEN TESTED IN ACCORDANCE WITH ASTM C457 "STANDARD TEST METHOD FOR MICROSCOPICAL DETERMINATION OF PARAMETERS OF THE AIR-VOID SYSTEM IN HARDENED CONCRETE".

### II REINFORCING STEEL

- ALL REINFORCING STEEL TO BE CSA-G30.10M-09 GRADE 400R DEFORMED BARS EXCEPT BEAM STIRRUPS WHICH SHALL BE GRADE 400N STEEL. ALL REINFORCING IS TO BE DETAILED IN ACCORDANCE WITH THE LATEST EDITION OF THE REINFORCING STEEL INSTITUTE OF CANADA - MANUAL OF STANDARD PRACTICE, EXCEPT OTHERWISE NOTED.
- REINFORCING STEEL COVER IS TO CONFORM TO CAN/CSA A23.3-14 "DESIGN OF CONCRETE STRUCTURES FOR BUILDINGS" AND AS FOLLOWS:

EXTERIOR WALLS: EXPOSURE CLASS: F-2 40 mm OUTSIDE FACE 20 mm INSIDE FACE

INTERIOR STRUCTURAL SLABS: EXPOSURE CLASS: N 20 mm TOP 20 mm BOTTOM

GRADE BEAMS: EXPOSURE CLASS: F-2 50 mm BOTTOM TO TIES 40 mm SIDES AND TOP TO TIES.

PILES: EXPOSURE CLASS: S-2 75 mm TO TIES.

INTERIOR SLABS-ON-GRADE: EXPOSURE CLASS: N 40 mm TOP 20 mm BOTTOM

- IN WALLS AND GRADE BEAMS, BEND ALL TOP AND INTERMEDIATE HORIZONTAL STEEL 90° mm AROUND CORNERS, OR USE EXTRA L BARS 1200 mm LONG. ALL OPENINGS IN WALLS TO HAVE 2-15M EACH SIDE AND 2-25M OVER, EXCEPT AS NOTED.
- TOP STEEL IN BEAMS TO BE LAPPED AT CENTRE SPAN, BOTTOM STEEL TO BE BUTTED AT SUPPORT.
- ALL REINFORCING TO BE HELD IN PLACE, AND TIED BY THE USE OF PROPER ACCESSORIES, SUCH AS HI-CHAIRS, SPACERS, ETC. TO BE SUPPLIED BY THE REINFORCING STEEL FABRICATOR. HI-CHAIRS TO HAVE 4 LEGS AND TO BE STAPLED OR WAILED TO THE FORMWORK.
- ALL OPENINGS IN CAST-IN-PLACE CONCRETE FLOWWORK TO BE TRIMMED WITH 2-15M ALL AROUND ON BOTH FACES, EXCEPT AS NOTED.
- FOR ALL STRUCTURAL SLABS A MINIMUM OF 50% OF THE BOTTOM STEEL SHALL BE CONTINUED A MINIMUM DISTANCE OF 150 mm INTO ALL SUPPORTING WALLS AND BEAMS. IF KEYS ARE USED AT JOINTS BETWEEN SLABS AND WALLS OR BEAMS, BOTTOM DOWELS EQUAL TO BOTTOM REINFORCEMENT OR 10M AT 300 mm O/C SHALL BE PROVIDED WHICHEVER IS GREATER.
- ALL MISCELLANEOUS CONCRETE PADS AND CURBS ARE TO BE REINFORCED WITH A MINIMUM OF 10M AT 400 mm O/C EACH WAY, UNLESS NOTED.
- WHEN CONCRETE BEAMS ARE CAST INTO A WALL CHASE, DOWELS SIZE AND NUMBER SAME AS BEAM REINFORCING ARE TO BE PROVIDED FROM WALL, UNLESS OTHERWISE SHOWN ON PLAN.

### III FORMWORK

- CARDBOARD VOIDFORM WITH A MIN. DEPTH OF 150 mm SHALL BE USED AS THE BOTTOM FORM FOR STRUCTURAL SLABS AT GRADE, GRADE BEAMS, AND WALLS IN CONTACT WITH SOIL. SELECT AND INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- ACCESSORIES SUCH AS HI-CHAIRS, SPACERS, ETC. SHALL BE SUPPORTED BY PADS OF PLYWOOD OR TREATED HARDBOARD TO PREVENT PUNCTURING THE VOIDFORM.
- UNLESS NOTED OTHERWISE PROVIDE SLIP JOINT ALL PAVING OR CONCRETE SLABS ON GRADE AGAINST STRUCTURAL MEMBERS WITH 12 mm ASPHALT IMPREGATED FIBREBOARD.
- ALL CONSTRUCTION JOINT KEYS ARE TO BE A MINIMUM OF 40 mm DEEP.
- ALL STRUCTURAL SLABS FRAMING INTO BASEMENT WALLS ARE TO HAVE A MINIMUM KEY OF 40 mm.
- ALL CONCRETE BEAMS FRAMING INTO CONCRETE WALLS ARE TO BE SUPPORTED BY A CHASE OF MINIMUM 100 mm DEPTH AND THE HEIGHT AND WIDTH OF THE BEAM.
- PLACE 10 MIL POLYETHYLENE UNDER ALL SLABS ON FILL AND OVER TOP OF VOIDFORM.
- PROVIDE 150 mm WIDE, TYPED, PVC INTERSTERS IN ALL HORIZONTAL AND VERTICAL CONSTRUCTION JOINTS IN ALL EXTERIOR WALLS BELOW GRADE AND PIT WALLS.

### STRUCTURAL STEEL

- STRUCTURAL STEEL TO CONFORM TO CSA-G40.21, "STRUCTURAL QUALITY STEELS" AND CSA-G40.20 "GENERAL REQUIREMENTS FOR ROLLED OR WELDED STRUCTURAL QUALITY STEEL".
- ALL ROLLED OR STEEL STRUCTURAL SECTIONS SHALL BE G40.21-350M. ALL HOLLOW STRUCTURAL SECTIONS TO BE G40.21-350M CLASS C OR ASTM A500-C. ALL ANGLES, CHANNELS AND PLATES SHALL BE G40.21-300M.
- FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE PERFORMED IN ACCORDANCE WITH CSA S16-14, "DESIGN OF STEEL STRUCTURES".
- ALL WELDING SHALL CONFORM TO THE LATEST EDITION OF CSA W59, "WELDED STEEL CONSTRUCTION". FABRICATORS SHALL BE PROPERLY CERTIFIED IN ACCORDANCE WITH CSA W47.1, "CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL STRUCTURES".
- ALL BOLTED CONNECTIONS TO USE A325 HIGH STRENGTH BOLTS. MINIMUM CONNECTION SHALL CONSIST OF 2 BOLTS.
- A STRUCTURAL STEEL IS TO RECEIVE ONE COAT OF CSC/CPMA 1-75q QUICK DRYING SHOP PRIMER. STEEL TO BE CLEANED IN CONFORMANCE WITH SSPC-SP-2. STEEL RECEIVING FINISH PAINTING TO HAVE ONE COAT OF CSC/CPMA 2-75 QUICK DRYING SHOP PRIMER. STEEL TO BE CLEANED IN CONFORMANCE WITH SSPC-SP-7. STEEL DESIGNATED AS GALVANIZED TO CONFORM TO CSA G184 "HOT-DIP GALVANIZING OF IRREGULARLY SHAPED ARTICLES" TO MINIMUM 610 g/m<sup>2</sup> COATING.
- ANCHOR BOLTS TO BE ASTM A307 GRADE C OR ASTM F1554 GRADE 36, WELDABLE, PROVIDED BY STEEL SUPPLIER AND SET BY THE GENERAL CONTRACTOR, WHERE ASTM F1554 GRADE 55 ANCHOR BOLTS ARE USED, BOLTS TO BE WELDABLE GRADE STEEL.
- FABRICATOR TO NOTIFY ENGINEER OF ANY PROPOSED MEMBER SUBSTITUTIONS AND CHANGED CONNECTION DETAILS.
- THE STRUCTURAL STEEL SUPPLIER SHALL PROVIDE AND BE RESPONSIBLE FOR ALL HOLES IN STEEL SECTIONS REQUIRED BY OTHER TRADES. SECTIONS SHALL BE STRENGTHENED WHERE REQUIRED TO GUARANTEE THE ORIGINAL STRENGTH OF THE BEAM. ANY CUTTING OF STEEL AT THE JOB SITE SHALL BE DONE ONLY AS DIRECTED AND APPROVED BY THE ENGINEER.
- STRUCTURAL STEEL SUPPLIER IS TO SUBMIT ENGINEERING DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA COVERING THE DESIGN OF CONNECTIONS, TO THE PROJECT DESIGN ENGINEER FOR REVIEW PRIOR TO FABRICATION. CONNECTION DESIGN TO INCLUDE FOR ALL ADJUSTABLE CONNECTIONS REQUIRED TO SUITE FABRICATION AND ERECTION PROCEDURES AND TOLERANCES.

### MISCELLANEOUS METAL - STEEL STAIR AND GUARDRAILS

- STEEL STAIR AND GUARDRAIL SUPPLIER IS TO SUBMIT ENGINEERING DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA FOR REVIEW BY THE PROJECT ENGINEER, PRIOR TO FABRICATION. ENGINEERING SHOP DRAWINGS SHALL INCLUDE DESIGN LOADS, LAYOUT PLAN, CONNECTION DETAILS, AND ALL OTHER PERTINENT INFORMATION.
- STEEL STAIR AND GUARDRAIL SUPPLIER/DESIGNER SHALL PROVIDE A FINAL INSPECTION AND A LETTER SEALED BY THE ENGINEER RESPONSIBLE FOR THE STAIR AND GUARDRAIL DESIGN, CERTIFYING THAT STAIRS AND GUARDRAILS ARE CONSTRUCTED AND INSTALLED AS PER DESIGN ASSUMPTIONS AND INSTALLATION REQUIREMENTS.

### WOOD

- ALL LUMBER TO BE NO.1/NO.2 SPF. ALL WOOD TO BE KILN DRIED.
- ALL WALLS TO BE ADEQUATELY BRACED UNTIL SHEATHING INSTALLED ON WALLS, FLOOR BELOW AND STRUCTURES ABOVE.
- THE BOTTOM PLATE AT THE MAIN FLOOR IS TO BE BOLTED TO THE FOUNDATION WITH A MINIMUM OF 13 mm DIAMETER ANCHOR BOLTS 100 mm EMBEDMENT 600 mm O/C.
- WALING PATTERNS AND WALL LENGTHS SHALL CONFORM TO TABLE 9.23.3.4. AND 9.23.3.5. OF THE NATIONAL BUILDING CODE RESIDENTIAL STANDARDS.
- PLYWOOD SHEATHING SHALL BE EXTERIOR DOUGLAS FIR PLYWOOD CONFORMING TO CSA 0121-08(R2013) "DOUGLAS FIR PLYWOOD" UNLESS OTHERWISE NOTED.

### MASONRY

- EXTERIOR AND LOAD BEARING WALLS ARE TO BE BUILT WITH TYPE "S" MORTAR HAVING A MINIMUM STRENGTH OF 12 MPa AT 28 DAYS. INTERIOR MASONRY NON-LOAD BEARING WALLS MAY BE BUILT WITH TYPE "M" MORTAR HAVING A COMPRESSIVE STRENGTH OF 5 MPa AT 28 DAYS. MORTAR SHALL CONFORM TO CSA A178-14, "MORTAR AND GROUT FOR UNIT MASONRY".
- ALL MASONRY WALLS TO BE PROPERLY BRACED UNTIL STRUCTURE IS CLOSED IN AND WALL PERMANENTLY SUPPORTED.
- MASONRY TIES AND ANCHORS SHALL BE DESIGNED IN CONFORMANCE WITH CSA-A370-14, "CONNECTORS FOR MASONRY". DESIGN WIND PRESSURE FOR TIES IN EXTERIOR WALLS SHALL BE 1.2 kPa

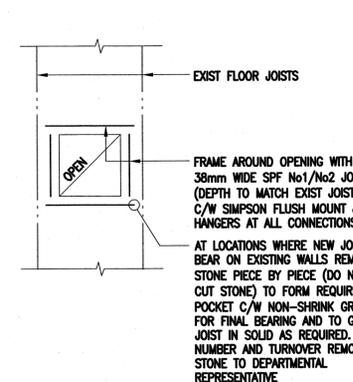
PILE SCHEDULE		
MARK	DESCRIPTION	ELEVATION
P1	4004 x 10000 LG CAST-IN-PLACE CONC FRICTION PILE	SEE PLAN
P2	5004 x 10000 LG CAST-IN-PLACE CONC FRICTION PILE	SEE PLAN

WALL SCHEDULE		
MARK	DESCRIPTION	REINFORCING
W1	250 CONC WALL	2-20M TOP & BOTTOM CONTINUOUS 15M @ 300 O/C VERT INSIDE FACE OUTER LAYER 10M @ 400 O/C VERT OUTSIDE FACE OUTER LAYER 10M @ 400 O/C HORIZ EACH FACE INSIDE LAYER

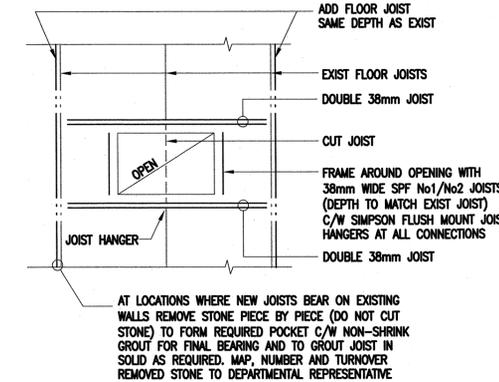
LINTEL SCHEDULE	
MARK	DESCRIPTION
L1	2 PLY 38x140 SPF #2 LINTEL C/W SINGLE JACK & KING STUDS
L2	3 PLY 38x140 SPF #2 LINTEL C/W SINGLE JACK & DOUBLE KING STUDS

SLAB SCHEDULE		
MARK	DESCRIPTION	REINFORCING
S1	150 CONC SLAB ON 150 CARDBOARD VOIDFORM BELOW SLAB WHERE FORMED AT GRADE	15M @ 200 O/C EACH WAY BOTTOM
S2	200 CONC SLAB ON 150 CARDBOARD VOIDFORM	15M @ 300 O/C EACH WAY TOP & BOTTOM

CONC BEAM SCHEDULE		
MARK	DESCRIPTION	REINFORCING
B1	250 x 600 CONC BEAM ON 150 CARDBOARD VOIDFORM	2-25M TOP & BOTTOM CONTINUOUS 10M STIRRUPS @ 300 O/C MAX
B2	250 x 1680 CONC BEAM ON 150 CARDBOARD VOIDFORM	2-25M TOP & BOTTOM CONTINUOUS, 2-15M EACH FACE 10M STIRRUPS @ 300 O/C MAX
B3	250 x 400 CONC BEAM	2-20M TOP & BOTTOM CONTINUOUS, 10M STIRRUPS @ 300 O/C MAX
B4	250 x 524 CONC BEAM	2-20M TOP & BOTTOM CONTINUOUS, 10M STIRRUPS @ 300 O/C MAX



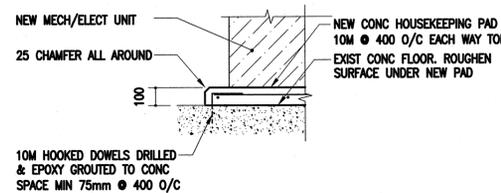
OPENING NARROWER THAN JOIST SPACE



OPENING WIDER THAN JOIST SPACE

## TYPICAL EXIST WOOD FRAMED FLOOR OPENING DETAIL FOR MECH/ELECT

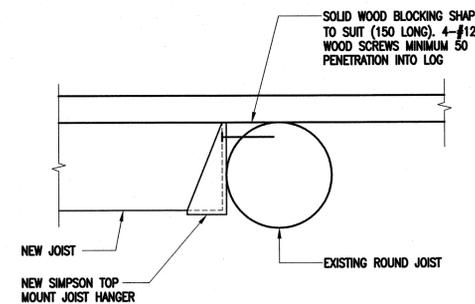
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## TYPICAL HOUSEKEEPING PAD DETAIL

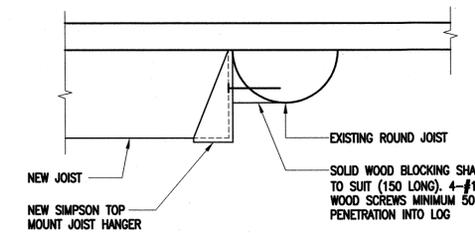
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- COORDINATE EXACT DIMENSIONS & LOCATIONS REQUIRED WITH MECHANICAL & ELECTRICAL



DETAIL AT FULL ROUND JOIST

1 : 5



DETAIL AT HALF ROUND JOIST

1 : 5



### DO NOT SCALE DRAWINGS

Revision/	Description/Description	Date/Date
E	ISSUED FOR TENDER	16/09/12
D	RE-ISSUED FOR REVIEW	16/08/05
C	99% CONSTRUCTION DOCUMENT SUBMISSION	16/06/27
B	50% CONSTRUCTION DOCUMENT SUBMISSION	16/05/13
A	DESIGN DEVELOPMENT SUBMISSION	16/02/19

Client/client  
**Public Works and Government Services Canada**  
100 - 167 Lombard Avenue  
Winnipeg, Manitoba

Project title/Titre du projet  
Lower Fort Garry (LFG)  
National Historic Site, Manitoba

### HERITAGE BUILDING RECAPITALIZATION

Approved by/Approuvé par  
SS

Designed by/Concept par  
BF

Drawn by/Dessiné par  
CL

PWSC Project Manager/Administrateur de Projets TPSC  
CHRISTINA KOVACS

PWSC, Architectural and Engineering Resources Manager/  
Ressources Architectural et de Directeur d'ingénierie, TPSC

Client/client  
PWSC

Drawing title/Titre du dessin

### BASEMENT/FOUNDATION GENERAL NOTES & SCHEDULES

Project No./No. du projet	Sheet/Fauille	Revision no./ Lo Révision
R.075212.001	S1	E

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