

EXCAVATION & BACKFILL:

1. REMOVE ALL FILL MATERIALS, DELETERIOUS SOILS AND ORGANICS IN AREAS REQUIRING GRANULAR BASE MATERIALS. COMPACT SUBGRADE TO 100% STANDARD PROCTOR DENSITY. SUB-EXCAVATE AND REPAIR ALL AREA EXHIBITING UNSUITABLE DEFLECTIONS.
2. GRANULAR BASE TO BE PLACED ON GRADE SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY IN MAXIMUM 150mm LIFTS.

GRANULAR FILL REQUIREMENTS FOR FLOOR SLAB		
SIEVE SIZE	BASE COURSE	SUB-BASE
37.5 mm	-	100%
25 mm	-	85 - 100%
19 mm	100%	-
16 mm	80 - 100%	-
4.75 mm	45 - 70%	25 - 80%
2.00 mm	25 - 55%	-
425	15 - 30%	15 - 40%
75	8 - 15%	8 - 18%
CRUSH CONTENT	35% MAX.	15% MAX.
SHALE CONTENT	12% MAX.	15% MAX.
LA ABRASION	35% MAX.	40% MAX.

3. DO NOT COMPACT FROZEN BACKFILL OR PLACE ON FROZEN SUBGRADE.
4. SUB-GRADE, SUB-BASE AND BASE COURSE MATERIALS AND CONSTRUCTION METHODS SHALL BE AS PER GEOTECHNICAL SURVEY PREPARED BY STANTEC ARCHITECTURE LTD. DATED FEBRUARY 26, 2013, UNLESS NOTED.
5. SUBGRADE AND BASE COURSE INSTALLATION SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER, REGISTERED IN THE PROVINCE OF MANITOBA, AT CONSTRUCTION PHASES AS DETERMINED BY THE GEOTECHNICAL ENGINEER, BEFORE WORK IS TO COMMENCE COST OF INSPECTION BY THE CONTRACTOR.

FOUNDATIONS (DRIVEN TIMBER PILES):

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE CONTRACT DOCUMENTS AND THE PILING SPECIFICATION.
2. FOUNDATIONS SHALL BE DRIVEN TIMBER PILES AS SHOWN ON DRAWINGS.
3. DRIVEN TIMBER PILES HAVE BEEN DESIGNED FOR, AND SHALL BE DRIVEN TO CAPACITIES SHOWN IN THE PILE SCHEDULE IN ACCORDANCE WITH RECOMMENDATIONS MADE BY GEOTECHNICAL SURVEY PREPARED BY STANTEC ARCHITECTURE LTD. DATED FEBRUARY 26, 2013.
4. PILE CAPACITIES ARE BASED ON A FACTORED SKIN FRICTION VALUE OF 6 kPa AT 1.5m TO 28.64 kPa @ 12.2m. THE FRICTIONAL SUPPORT OF THE TOP 1.5m OF INTERIOR PILES AND TOP 2.5m OF PERIMETER PILES HAVE BEEN IGNORED.
5. TIMBER PILES SHALL BE DOUGLAS FIR IN ACCORDANCE WITH CAN3-056 (LATEST) AND PRESSURE TREATED IN ACCORDANCE WITH CANCSA-080 (LATEST).
6. FULL TIME INSPECTION BY A QUALIFIED INDEPENDENT GEOTECHNICAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA, SHALL BE PROVIDED DURING THE INSTALLATION OF ALL PILES. THE COST OF THIS SERVICE SHALL BE INCLUDED IN THE PILING CONTRACT.
7. THE PILING CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND SERVICES IN PILING AREA WHETHER SHOWN OR NOT. EXPOSE ALL SERVICES CLOSE TO PILING AS REQUIRED. CONDITION OF NEARBY STRUCTURES (WITHIN 30.5 METRES OF SITE), SHALL BE DOCUMENTED VERBALLY AND/OR PHOTOGRAPHICALLY PRIOR TO DRIVING PILES. THE PILING CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF ANY DAMAGE RESULTING FROM PILING OPERATIONS.
8. REFER TO SPECIFICATIONS FOR PILE INSTALLATION TOLERANCES.
9. SPLIT OR SHATTERED PILES SHALL BE REJECTED.
10. DO NOT SPLICE PILES WITHOUT APPROVAL OF THE DESIGN ENGINEER.
11. PRE-BORE ALL PILES 2.0m.
12. RESET PILES LIFTED DURING DRIVING OF ADJACENT PILES.
13. CUT-OFF PILES NEAT AND SQUARE AT ELEVATIONS INDICATED. TREAT EXPOSED ENDS WITH PRESERVATIVE.

CONCRETE:

1. CONCRETE MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH CSA A23.1 (LATEST). SEE BELOW FOR MIX REQUIREMENTS.
2. ADMIXTURES SHALL NOT BE USED UNLESS SPECIFIED HEREIN OR APPROVED BY THE DESIGN ENGINEER. CALCIUM CHLORIDE SHALL NOT BE USED.
3. INTEGRAL CRYSTALLINE CAPILLARY WATERPROOFING ADMIXTURE SHALL BE USED IN HEADER HOUSE AND GREENHOUSE CONCRETE FLOORS. USE IN STRICT ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.
- ACCEPTABLE PRODUCT (OR APPROVED EQUAL)
- RHEOMAC 300D AS MANUFACTURED BY BASF CORPORATION.
- VANDEX AM10
- KRYTON CONCRETE WATERPROOFING ADMIXTURE
4. MIX WATER SHALL BE POTABLE.
5. DESIGN, FABRICATE AND ERECT FORMWORK/SHORING IN ACCORDANCE WITH CANCSA-S269.3 (LATEST). ALLOW SUFFICIENT CONCRETE CURING TIME PRIOR TO REMOVAL.
6. CONCRETE FINISHING SHALL MEET THE REQUIREMENTS OF CSA A23.1 (LATEST).
7. FORM RELEASE AGENT SHALL BE BIODEGRADABLE, NON-STAINING AND NON-VOLATILE.
8. PROVIDE ADEQUATE COLD/HOT WEATHER PROTECTION AS REQUIRED DURING CURING PERIOD.
9. PLACE AND SECURE ALL EMBEDDED ANCHORS, WELD PLATES, SLEEVES, BUCKS, DOWELS, INSERTS, WATERSTOPS, ETC., PRIOR TO PLACING CONCRETE. CO-ORDINATE WITH ALL TRADES FOR EMBEDDING OF ALL OTHER, CONDUIT, SERVICES, BLOCKING, ETC.
10. LOCATE AND FABRICATE ALL CONSTRUCTION JOINTS, CONTROL JOINTS AND EXPANSION JOINTS AS DETAILED ON THE DRAWINGS. JOINTS NOT SHOWN SHALL BE APPROVED BY THE DESIGN ENGINEER PRIOR TO THE PLACEMENT OF CONCRETE.
11. ALL EXPOSED CORNERS TO HAVE 19mm CHAMFER UNLESS NOTED.
12. SAWCUTS TO BE 3mm WIDE X 25mm DEEP AT A SPACING AS NOTED ON DRAWINGS, WITHIN 24 HOURS OF POUR. SAW CUTS TO BE FILLED WITH POLYURETHANE, HIGH PERFORMANCE, NON-LOADBEARING SEALANT. INSTALL AS PER MANUFACTURER'S WRITTEN INSTRUCTIONS.
- ACCEPTABLE PRODUCT (OR APPROVED EQUAL)
- SIKAFLEX POLYURETHANE SELF-LEVELING SEALANT
- LOCTITE PL S20
13. EXPANSION JOINTS TO BE FORMED WITH A PREFORMED JOINT FILLER WITH A 12mm TEAR AWAY STRIPS.
- ACCEPTABLE PRODUCT (OR APPROVED EQUAL)
- FOAMTECH EXPANSION JOINT
- DECK-O-FOAM EXPANSION JOINT FILLER
- NOR-FLEX 100
14. SEAL EXPANSION JOINT WITH BACKER ROD AND ONE COMPONENT , MULTIPURPOSE, POLYURETHANE SEALANT.
- ACCEPTABLE PRODUCT (OR APPROVED EQUAL)
- SIKAFLEX CONSTRUCTION SEALANT
- DYMONIC 100
- MAPEFLEX PU45
15. CAST-IN-PLACE ANCHOR BOLTS SHALL MEET REQUIREMENTS OF ASTM A307 (LATEST).
16. EXPANSION ANCHORS, UNLESS NOTED. INSTALL AS PER MANUFACTURER'S INSTRUCTIONS.
- ACCEPTABLE PRODUCT (OR APPROVED EQUAL)
- HILTI KWIK-BOLT III
- SIMPSON STRONG-TIE WEDGE-ALL
- POWER-STUD HD5
17. ADHESIVE ANCHORS, UNLESS NOTED. INSTALL AS PER MANUFACTURER'S INSTRUCTIONS.
- ACCEPTABLE PRODUCT (OR APPROVED EQUAL)
- HILTI HIT-HY200 MAX
- POWER AC 100+ GOLD
- UCAN FLO-ROK FR3MAX
18. GROUT REINFORCING DOWELS WITH EPOXY GROUT. PLACE AND CURE ALL GROUT WITHIN TEMPERATURE RANGE RECOMMENDED BY MANUFACTURER.
- ACCEPTABLE PRODUCT (OR APPROVED EQUAL)
- SAKRETE NON-SHRINK PRECISION GROUT
- SAKRETE NON-SHRINK CONSTRUCTION GROUT
20. BONDING AGENTS SHALL BE USED TO ADHERE NEW CONCRETE TO EXISTING CONCRETE OR STEEL.
- ACCEPTABLE PRODUCT (OR APPROVED EQUAL)
- SIKADUR 32 HI-MOD (EPOXY)
- CONCRESLIVE 1001PL#3
- CCS BONDER LIQUID LWL
21. THE CONCRETE SUPPLIER SHALL BE CERTIFIED TO MEET THE REQUIREMENTS OF CSA A23.1.
22. THE CONCRETE SUPPLIER SHALL SUBMIT CONCRETE MIX DATA SUBMISSION FORMS FOR EACH TYPE OF CONCRETE SPECIFIED FOR REVIEW PRIOR TO BATCHING ANY CONCRETE.

CONCRETE MIX DESIGNS:

CONCRETE MIX DESIGN SHALL BE PROPORTIONED TO MEET THE FOLLOWING PERFORMANCE REQUIREMENTS.

PILE CAPS:

EXPOSURE CLASS	S-2
MIN. 56 DAY COMP. STRENGTH	32 MPa
CEMENT TYPE	HS
MAX. W/C RATIO	0.45
MAX. AGGREGATE SIZE	20mm
ENTRAINED AIR CONTENT	4%-7%

GRADE BEAMS:

EXPOSURE CLASS	S-2
MIN. 56 DAY COMP. STRENGTH	32 MPa
CEMENT TYPE	HS
MAX. W/C RATIO	0.45
MAX. AGGREGATE SIZE	20mm
ENTRAINED AIR CONTENT	4%-7%

EXTERIOR SLABS (STRUCTURAL):

EXPOSURE CLASS	C-1
MIN. 28 DAY COMP. STRENGTH	35 MPa
CEMENT TYPE	GU
MAX. W/C RATIO	0.40
MAX. AGGREGATE SIZE	20mm
ENTRAINED AIR CONTENT	5%-8%

EXTERIOR SLABS (NON-STRUCTURAL):

EXPOSURE CLASS	C-2
MIN. 28 DAY COMP. STRENGTH	32 MPa
CEMENT TYPE	GU
MAX. W/C RATIO	0.45
MAX. AGGREGATE SIZE	20mm
ENTRAINED AIR CONTENT	5%-8%

INTERIOR CONCRETE, ALL SLABS, WALLS, BEAMS:

EXPOSURE CLASS	N
MIN. 28 DAY COMP. STRENGTH	30 MPa
CEMENT TYPE	GU
MAX. W/C RATIO	0.45
MAX. AGGREGATE SIZE	20mm
ENTRAINED AIR CONTENT	N/A

REINFORCING STEEL:

1. REINFORCING STEEL TO BE NEW DEFORMED BILLET STEEL BARS CONFORMING TO CSA G30.18 (LATEST). GRADE TO BE 400 MPa.
2. WELDABLE REINFORCING STEEL TO BE GRADE 400W.
3. REINFORCING STEEL SHALL BE CLEAN, FREE OF RUST, DIRT, LOOSE SCALE, OIL, GREASE OR ANY OTHER MATERIAL WHICH WOULD REDUCE BOND WITH THE CONCRETE.
4. WELDED STEEL WIRE FABRIC SHALL CONFORM TO ASTM A185 OR A497 (LATEST). 400 MPa MINIMUM GRADE IN FLAT SHEETS ONLY UNLESS APPROVED OTHERWISE.
5. SUBMIT SHOP DRAWINGS WHICH CLEARLY INDICATE BAR SIZES, SPACINGS, LOCATIONS & QUANTITIES OF REINFORCING STEEL, BENDING & CUTTING SCHEDULES, SUPPORTING & SPACING DEVICES, ETC. FOR REVIEW PRIOR TO FABRICATION. DETAIL, FABRICATE AND PLACE REINFORCING IN ACCORDANCE WITH CSA A23.1 (LATEST), CSA A23.3 (LATEST) AND ACI SP-86 (LATEST) UNLESS NOTED. LAP STEEL 36 BAR DIAMETERS (MINIMUM) UNLESS NOTED.
6. LAP BEAM AND STRUCTURAL SLAB TOP REINFORCING AT CENTER SPAN, AND BOTTOM STEEL AT SUPPORTS.
7. BEND ALL HORIZONTAL REINFORCING 305mm AROUND CORNERS OR PROVIDE ADDITIONAL 610mm X 610mm ANGLE BARS.
8. PROVIDE AT EACH FACE, 2-15M EXTRA BARS ALONG ALL SIDES, AND 2-15M DIAGONAL BARS AT ALL CORNERS OF OPENINGS UNLESS NOTED. PROJECT ALL BARS 610mm PAST CORNERS.
9. TIE, SUPPORT AND SPACE ALL REINFORCING STEEL WITH PROPER APPROVED DEVICES DESIGNED FOR USE IN REINFORCED CONCRETE, TO PREVENT DISPLACEMENT OF REINFORCING AND ENSURE SPECIFIED CONCRETE COVER.
10. PROVIDE MINIMUM CONCRETE COVER FOR REINFORCING STEEL AS FOLLOWS:
- |                        |      |
|------------------------|------|
| PILECAPS               | 75mm |
| GRADE BEAMS (SIDES)    | 38mm |
| GRADE BEAMS (BOTTOM)   | 64mm |
| SLAB-ON-GRADE (TOP)    | 50mm |
| SLAB-ON-GRADE (BOTTOM) | 75mm |

STRUCTURAL AND MISCELLANEOUS STEEL:

1. STRUCTURAL AND MISCELLANEOUS STEEL FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH CAN/CSA S16 (LATEST).
2. STRUCTURAL STEEL SHALL MEET THE REQUIREMENTS OF CAN/CSA G40.20/G40.21 (LATEST).
- ROLLED SHAPES & PLATES CSA G40.21-300W
- STANDARD PIPE ASTM A53
- ANCHOR BOLTS (GALV.) ASTM A307
- BOLTS, NUTS, & WASHERS ASTM A325
- WELDING ELECTRODES CSA W48.1
3. WELDING SHALL BE IN ACCORDANCE WITH CSA W59 (LATEST), BY WELDERS CERTIFIED AND QUALIFIED IN ACCORDANCE WITH CSA W47.1 (LATEST). ALL WELDS TO BE 6MM UNLESS NOTED OTHERWISE.
4. FIELD CONNECTIONS SHALL BE BOLTED 19MM DIAMETER A325 BEARING TYPE UNLESS NOTED OTHERWISE. BOLTS SHALL BE TIGHTENED IN ACCORDANCE WITH CSA S16 (LATEST).
5. STRUCTURAL AND MISCELLANEOUS STEEL SHALL BE FINISHED AS INDICATED BELOW, UNLESS OTHERWISE NOTED, OR APPROVED EQUAL.:
- INTERIOR & EXTERIOR STEEL
- SURFACE PREP. TO SP8 (PICKLING)
- HOT DIP GALVANIZED TO ASTM A123-13
6. THE STRUCTURAL STEEL ERECTOR SHALL BE RESPONSIBLE FOR LOCATING AND DESIGNING PROVISIONS FOR ALL TEMPORARY FALL PROTECTION SYSTEMS REQUIRED DURING CONSTRUCTION TO MEET MANITOBA WORKPLACE HEALTH AND SAFETY REGULATIONS.
7. FABRICATOR TO NOTIFY ENGINEER OF ANY PROPOSED MEMBER SUBSTITUTIONS AND CHANGED CONNECTION DETAILS.
8. 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.

STRUCTURAL STEEL GRATING:

1. STEEL GRATING TO BE TYPE 30-102M GALV. STANDARD FLOWFORGE STEEL GRATING.
2. BEARING BARS TO BE 32mm DEEP x 4.9mm WIDE SPACED AT 36mm CENTERS UNLESS NOTED OTHERWISE.
3. GRATING SHALL HAVE A GALVANIZED FINISH.
4. ALL CUT EDGES SHALL BE BANDED.
5. GRATING SHALL BE FASTENED TO STRUCTURAL STEEL WITH GALV. SADDLE CLIPS AT CORNERS AND EVERY TENTH BEARING BAR.

REAL PROPERTY SERVICES  
Western Region  
SERVICES IMMOBILIERS  
Région de l'ouest

Design Team Consultant

**KGS GROUP** | CONSULTING ENGINEERS

0	ISSUED FOR TENDER	2016/06/27
Revision	Description	Date

Client client

**PUBLIC WORKS & GOVERNMENT SERVICES CANADA**

Project Projet  
**MORDEN, MANITOBA  
101 ROUTE 100, UNIT 100**

**MORDEN RESEARCH  
AND DEVELOPMENT CENTRE  
GREENHOUSE EXTENSION**

Designed by Conçu par <b>PPG</b>	
Drawn by Dessiné par <b>JAR</b>	
Approved by Approuvé par <b>JAR</b>	
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Drawing title Titre du dessin <b>STRUCTURAL NOTES</b>	

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