## GENERAL NOTES

1. READ THE STRUCTURAL DRAWINGS IN CONJUNCTION WITH ALL OTHER PERTINENT CONTRACT DOCUMENTS.
2. ALL DIMENSIONS ARE IN METRIC UNITS UNLESS NOTED. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS SHOWN ON THE STRUCTURAL DRAWINGS AGAINST THE CIVIL, MECHANICAL AND ELECTRICAL DRAWINGS AND THE EXISTING SITE CONDITIONS BEFORE BEGINNING CONSTRUCTION AND REPORT DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE WORK. DO NOT SCALE DRAWINGS.
3. THE DESIGN AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NATIONAL BUILDING CODE OF CANADA 2010, WITH MANITOBA AMENDMENTS, IT'S SUPPLEMENTS AND THE LATEST EDITIONS OF REFERENCED CODES AND STANDARDS THEREIN, UNLESS NOTED OTHERWISE. BUILDING IMPORTANCE CATEGORY: POST-DISASTER.
4. REFER TO THE CIVIL, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS AND DIMENSIONS OF OPENINGS, SLEEVES AND OTHER COMPONENTS NOT SHOWN ON THE STRUCTURAL DRAWINGS. REPORT DISCREPANCIES AND OBTAIN CONTRACT ADMINISTRATOR'S PRIOR APPROVAL BEFORE INSTALLING SLEEVES AND OPENINGS THAT ARE NOT INDICATED ON THE STRUCTURAL DRAWINGS BEFORE PROCEEDING WITH CONSTRUCTION.
5. CONTRACTOR TO CONFIRM WITH EQUIPMENT SUPPLIERS DIMENSIONS AND ALL OTHER CRITICAL DETAILS PRIOR TO CONSTRUCTION AND INSTALLATION. REPORT DISCREPANCIES AND OBTAIN APPROVAL PRIOR TO PROCEEDING WITH CONSTRUCTION.
6. NOTIFY THE CONTRACT ADMINISTRATOR 48 HOURS IN ADVANCE FOR SITE REVIEW.
7. VERIFY LOCATION OF UNDERGROUND SERVICES AND BE RESPONSIBLE FOR DISRUPTIONS.
8. ALL SHOP DRAWING SUBMITTALS TO BE METRIC (MILLIMETERS) UNLESS NOTED.

## EXCAVATION & BACKFILL

1. ALL EXCAVATION AND BACKFILL WORK TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS GIVEN IN THE ENGINEERING REPORT "GEOTECHNICAL INVESTIGATION FOR SHOAL LAKE INTAKE FUEL STORAGE AND DELIVERY SYSTEM REHABILITATION", DATED FEBRUARY 17, 2015 AND PREPARED BY TREK GEOTECNICAL –FILE NO. 0015 010 00.
2. EXCAVATE TO LINES AND LEVELS NECESSARY TO PROPERLY COMPLETE THE WORK. CONTROL EXCAVATION TO ENSURE BOTTOM OF EXCAVATION DOES NOT SOFTEN DUE TO EXCESS MOISTURE.
3. EXCAVATE BELOW GRADE SUPPORTED SLABS TO REMOVE TOPSOIL, ORGANIC MATTER, DEBRIS, AND EXISTING FILL. PROOF ROLL SUB-GRADE TO DETECT SOFT AREAS; EXCAVATE SOFT AREAS AND FILL WITH COMPACTED SELECT GRANULAR BACKFILL AS DIRECTED BY ENGINEER.
4. ALL BACKFILL SHALL BE COMPACTED USING MECHANICAL EQUIPMENT. ON THE EXTERIOR OF THE STRUCTURES, THE BACKFILLING SHALL BE PLACED WITH SUFFICIENT ALLOWANCE FOR SETTLEMENT AND IN GENERAL, ITS TOP SURFACE SHALL BE NEATLY GRADED.
5. MAINTAIN OPTIMUM MOISTURE CONTENT TO PERMIT COMPACTION TO ATTAIN SPECIFIED DENSITIES. PROTECT BACKFILLED GRADE, DURING AND AFTER COMPLETION OF BACKFILL OPERATION, FROM SOFTENING DUE TO EXCESS MOISTURE.
6. BACKFILL TO GRADES INDICATED IN LAYERS NOT EXCEEDING 150mm COMPACTED THICKNESS.
7. SPECIFIED COMPACTION TO BE 98% OF STANDARD PROCTOR.

## DESIGN LOADS

1. DEAD LOADS:
   SEE PLANS FOR DEAD LOADS AND SUPERIMPOSED DEAD LOADS.
2. LIVE LOADS:
   SEE PLANS FOR LIVE LOADS.
3. SNOW LOADS (KENORA, ONTARIO)
   Ss= 2.3
   Sr= 0.3
   Is= 1.25 (ULS)
   Is= 0.9 (SLS)
   MODIFY FOR EXPOSURE AND DRIFT AS PER NBCC 2010
4. WIND LOADS (KENORA, ONTARIO)
   q(1/50)= 0.31
   q(1/10)= 0.35
   Iw= 1.25 (ULS)
   Iw= 0.75 (SLS)
   MODIFY FOR EXPOSURE AS PER NBCC 2010

## FOUNDATION

1. ALL FOUNDATION CONSTRUCTION TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS GIVEN IN THE ENGINEERING REPORT "GEOTECHNICAL INVESTIGATIONS FOR SHOAL LAKE INTAKE FUEL STORAGE AND DELIVERY SYSTEM REHABILITATION", DATED FEBRUARY 17, 2015 AND PREPARED BY TREK GEOTECHNICAL – FILE NO. 0015 0010 00.
2. SHALLOW FOUNDATION NOTES:
   1. ALL FOOTINGS WERE DESIGNED WITH THE FOLLOWING BEARING CAPACITIES:

| SUPPORTING MATERIAL | SLS BEARING RESISTANCE (kPa) | ULS BEARING RESISTANCE (kPa)* |
|---|---|---|
| UNDISTURBED CLAY | 100 | 125 |
| UNDISTURBED SAND | 130 | 160 |

   *USING GEOTECHNICAL RESISTANCE FACTOR = 0.4

3. BEARING SURFACES SHALL BE REVIEWED AND ACCEPTED BY A PROFESSIONAL GEOTECHNICAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA PRIOR TO CASTING OF CONCRETE. PROTECT BEARING SURFACES. DO NOT PLACE CONCRETE ON FROZEN SOIL.
4. PREVENT NEW CONCRETE SLABS AND SUBGRADE FROM FREEZING AFTER CASTING FOR CONCRETE SLABS UNTIL DESIGN STRENGTH IS ACHIEVED. SLOWLY REDUCE HEAT APPROX. 2°/DAY UNTIL BOTH CONCRETE TEMPERATURE AND AMBIENT TEMPERATURE ARE EQUAL.

## MISCELLANEOUS METALS

1. THE STEEL ERECTOR SHALL BE RESPONSIBLE FOR SUPPLYING AND ERECTING ALL TEMPORARY WORKS REQUIRED FOR THE STRUCTURE DURING ERECTION.
2. WELD TO CSA W59 BY FABRICATORS QUALIFIED TO CSA W47.1, IN DIVISION 2.
3. ISOLATE MISC. METALS FROM FOLLOWING COMPONENTS BY MEANS OF 2 COATS OF AKALI RESISTANT BITUMINOUS PAINT:
   .1 DISSIMILAR METALS EXCEPT STAINLESS STEEL, GALVANIZED STEEL, ZINC, OR WHITE BRONZE OF SMALL AREA.
   .2 CONCRETE, MORTAR AND MASONRY.

## CONCRETE REINFORCEMENT

1. DEFORMED BARS CONFORMING TO CSA G30.18 GRADE 400. LAP SPLICES SHALL BE CLASS B TOP TENSION LAP TYPE UNLESS NOTED OTHERWISE.
2. WELDABLE REINFORCING BARS SHALL CONFORM TO CSA G30.18 GRADE 400W. WELDING OF REINFORCING SHALL CONFORM TO CSA W186.
3. REINFORCING WORK SHALL BE IN ACCORDANCE WITH CSA A23.1 AND CSA A23.3.
4. REINFORCING STEEL SHALL BE DETAILED IN ACCORDANCE WITH THE LATEST EDITION OF THE REINFORCING STEEL INSTITUTE OF CANADA DETAILING MANUAL.
5. 90° HOOKS AND 180° HOOKS WHERE SHOWN SHALL BE DETAILED AS STANDARD HOOKS UNLESS NOTED OTHERWISE.
6. CONCRETE COVER TO REINFORCING STEEL SHALL CONFORM TO THE MOST STRINGENT REQUIREMENT LISTED BELOW UNLESS NOTED OTHERWISE:

| | |
|---|---|
| CONCRETE CAST AGAINST EARTH | 75 mm |
| CONCRETE CAST IN FORMS<br>COLUMNS – TO VERTS EACH FACE<br>RATIO OF COVER TO NOMINAL BAR DIAMETER | <br>40 mm<br>1.5 |
| EXTERIOR APRONS AND CONCRETE PADS<br>TOP BARS<br>BOTTOM BARS | <br>60 mm<br>75 mm |
| FOOTINGS<br>TOP BARS<br>BOTTOMS BARS | <br>40 mm<br>75 mm |

## CONCRETE ACCESSORIES

1. GROUT: NON-SHRINK, NON-METALLIC GROUT WITH MINIMUM STRENGTH AT THREE DAYS OF 20 MPA AND STRENGTH AT 28 DAYS OF 50 MPA.
2. EPOXY ANCHORS: OF DIAMETER SHOWN AND STANDARD EMBEDMENT U.N.O. SUBMIT ANCHOR LOAD RESISTANCE DATA FROM INDEPENDENT TESTING FIRM FOR REVIEW BY ENGINEER MINIMUM 2 WEEKS PRIOR TO INTENDED USE.
3. ASPHALT IMPREGNATED VEGETABLE OR CANE FIBERBOARD, CONFORMING TO ASTM D1751. APPROVED PRODUCTS: W.R. MEADOWS SEALTIGHT FIBER EXPANSION JOINT, STERNSON FLEXCELL.
4. POLYURETHANE SEALANT TO WITHSTAND A MAX. OF 25% JOINT MOVEMENT. SIKAFLEX 1a OR APPROVED EQUAL IN ACCORDANCE WITH B7 OF THE BIDDING PROCEDURES.
5. WATERSTOP: ONE COMPONENT, POLYURETHANE BASED ADHESIVE WATERSTOP RESISTANT TO FUELS. SIKAFLEX 1a OR APPROVED EQUAL IN ACCORDANCE WITH B7 OF THE BIDDING PROCEDURES.

## CONCRETE

1. PROVIDE CONCRETE AND PERFORM WORK TO CSA A23.1. SUPPLY CONCRETE TO ALTERNATIVE (1) PERFORMANCE. THE CONTRACTOR SHALL HAVE A COPY OF THIS STANDARD ON SITE AT ALL TIMES.
2. TEST CONCRETE IN ACCORDANCE WITH CSA A23.2.
3. ALL CONCRETE SHALL BE NORMAL-DENSITY WITH NORMAL-DENSITY FINE AGGREGATE AND BE PROPORTIONED TO MEET THE FOLLOWING REQUIREMENTS:

| LOCATION | CSA EXPOSURE CLASS | CEMENT TYPE | MINIMUM COMPRESSIVE STRENGTH (MPa) | MAX w/c RATIO | MAX AGGREGATE (mm) | AIR CONTENT (%) |
|---|---|---|---|---|---|---|
| FOOTINGS AND CONCRETE COLUMNS | S-1, F-2 | HS | 35 @ 28 Days | 0.40 | 20 | 4-7 |
| SLAB ON GRADE | S-1, C-1 | HS | 35 @ 28 Days | 0.40 | 20 | 5-8 |

## STRUCTURAL STEEL FRAMING

1. FABRICATE AND ERECT STRUCTURAL STEEL TO CSA-S16-09.
2. PROVIDE STRUCTURAL STEEL TO CSA-G40.21 WITH THE FOLLOWING GRADES:

| | |
|---|---|
| WIDE FLANGE BEAMS: | 350 W |
| CHANNELS AND ANGLES: | 300 W |
| HSS SECTIONS (CLASS 'C'): | 350 W |
| STRUCTURAL BARS AND PLATES: | 300 W |
| MISCELLANEOUS STEEL: | 300 W |
| ANCHOR RODS: | 300 W |

3. DIMENSIONS SHOWN ARE TO CENTER TO CENTER LINES OF SECTIONS AND TO BACK OF CHANNELS OR ANGLES UNLESS NOTED OTHERWISE. ELEVATIONS SHOWN ARE TO TOP OF STEEL U.N.O.
4. WELD TO CSA W59 BY FABRICATORS QUALIFIED TO CSA-W47.1.
5. FIELD WELDING AND FIELD MODIFICATION OF STRUCTURAL STEEL SHALL NOT BE ALLOWED WITHOUT PRIOR REVIEW AND APPROVAL BY THE CONTRACT ADMINISTRATOR.
6. TEMPORARY BRACING DURING CONSTRUCTION TO BE DESIGNED BY CONTRACTOR. ERECTION BRACING SHALL BE REMOVED ONLY AFTER STRUCTURE IS COMPLETED.
7. PROVIDE STIFFENER/BEARING PLATES ON BOTH SIDES OF W-SHAPE AT ALL LOCATIONS WHERE CONCENTRATED LOADS OCCUR AND AT BEARING SUPPORTS. EACH STIFFENER SHALL EQUAL HALF THE BEAM WIDTH, BE FULL HEIGHT BETWEEN FLANGES, AND HAVE A MINIMUM THICKNESS OF 8mm BUT SHALL NOT BE THINNER THAN THE WEB OF THE BEAM.

## STANDARD ABBREVIATIONS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ADDITIONAL | ADD'L | COLUMN | COL. | FIBERGLASS REINFORCED PLASTIC | FRP. | NUMBER | No. | SIMILAR | SIM. |
| AT | @ | CONCRETE | CONC. | FOUNDATION | FDN. | NOT TO SCALE | N.T.S. | SPECIFICATION | SPEC. |
| ANCHOR BOLT | A. BOLT | CONTINUOUS | CONT. | FOOTING | FTG. | ON CENTER | O.C. | SPECIAL COATING | SP. COATG. |
| ALTERNATE | ALTER. | DEAD LOAD | D.L. | GALVANIZE | GALV. | OUTSIDE FACE | O.F. | STAINLESS STEEL | S.S. |
| ALUMINUM | ALUM. | DOWN | DN. | HANGER | HGR. | OUT TO OUT | O/O | STANDARD | STD. |
| APPROXIMATE | APPROX. | DRAWING | DWG. | HOLLOW CORE | HC. | OUTSIDE DIAMETER | O.D. | STIFFENER | STIFF. |
| ARCHITECTURAL | ARCH. | DOWEL | DWL. | HOLLOW STRUCTURAL STEEL | HSS | OPENING | OPG. | STIRRUP | STIRR. |
| AVERAGE | AVG. | EACH | EA. | HORIZONTAL | HORIZ. | OPPOSITE | OPP. | STRUCTURAL | STRUCT. |
| BOTTOM | BOT. | EACH FACE | E.F. | HEIGHT | HT. | ORIGINAL | ORIG. | SYMMETRICAL | SYM. |
| BETWEEN | BET. | EXPANSION JOINT | EXP. J. | INSIDE FACE | I.F. | OPEN WEB STEEL JOIST | OWSJ | THICK | THK. |
| BLOCK | BLK. | EACH WAY | E.W. | INSIDE DIAMETER | I.D. | PAINT | PT. | TOP OF | T.O. |
| BUILDING | BLDG. | ELEVATION | EL. | INTERIOR | INT. | PLATE | PL. | TYPICAL | TYP. |
| BENCH MARK | B.M. | ELECTRICAL | ELEC. | KILO NEWTON | kN | PLYWOOD | PLYWD. | UNLESS NOTED | U/N |
| BEAM | BM. | EQUAL | EQ. | KNOCK-OUT BLOCK | K.O. | PRELIMINARY | PRELIM. | UNLESS NOTED OTHERWISE | U.N.O. |
| BEARING | BRG. | EQUIPMENT | EQUIPT. | LONG | LG | PRESSURE TREATED | P.T. | VERTICAL | VERT. |
| BACK TO BACK | B/B | EXISTING | EXIST. or (E) | LIVE LOAD | L.L. | PROJECTION | PROJ. | WIND LOAD | W.L. |
| BY (Between dims) | x (lower case) | EXPANSION | EXP. | MATERIAL | MATL. | REINFORCE WITH | R/W | WITH | W/ |
| CENTERLINE | ℄ | EXTERIOR | EXT. | MAXIMUM | MAX. | REINFORCING | REINF. | | |
| CAST IN PLACE | C.I.P. | FACE TO FACE | F. to F. | MECHANICAL | MECH. | REQUIRED | REV. | | |
| CONCRETE MASONRY UNIT | C.M.U. | FACE OF CONCRETE | F.O.C. | MIDDLE | MID. | REVISION | REQ'D | | |
| CONSTRUCTION JOINT | C.J. | FINISH | FIN. | MINIMUM | MIN. | SECTION | SECT. | | |
| COMPLETE WITH | C/W | FIRE RATING | F.R. | MISCELLANEOUS | MISC. | SHEET | SHT. | | |

BID OPPORTUNITY NO. 231-2015

| DRAWING NUMBER | REFERENCE DRAWINGS |
|---|---|
| 1-0600A-S0003-001-00 | STRUCTURAL - TANK SLAB DETAILS |
| 1-0600A-S0002-001-00 | STRUCTURAL - DIESEL AND GASOLINE FUEL TANK SLAB AND SECTIONS |

APEGM Certificate of Authorization
AECOM Canada Ltd.
No. 4671 Date: 1-APR-2015

LOCATION APPROVED
UNDERGROUND STRUCTURES
SUPR. U/G STRUCTURES COMMITTEE ____ DATE ____

NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE. BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

| NO. | REVISIONS | YY/MM/DD | BY |
|---|---|---|---|
| 0 | ISSUED FOR TENDER, BID OPP. 231-2015 | 15/04/13 | DRL |

AECOM

| | | | |
|---|---|---|---|
| DESIGNED BY | LT | CHECKED BY | CG |
| DRAWN BY | DRL | APPROVED BY | |
| HOR. SCALE | NTS | RELEASED FOR CONSTRUCTION | |
| VERT. SCALE | | | |
| DATE | | DATE | |

PROFESSIONAL'S SEAL: PROVINCE OF MANITOBA C. J. GENTILE Member 21688 REGISTERED PROFESSIONAL ENGINEER 1-APR-2015

CONSULTANT DRAWING NO. S0001

Winnipeg

# THE CITY OF WINNIPEG
## WATER AND WASTE DEPARTMENT

**SHOAL LAKE**
**INTAKE FUEL STORAGE AND**
**DELIVERY SYSTEM REHABILITATION**
**STRUCTURAL**
GENERAL NOTES
AND ABBREVIATIONS

SHEET 2 OF 22
CITY DRAWING NUMBER
1-0600A-S0001-001 REV 0