- A. DESIGN SPECIFICATIONS:
- This structure is designed in accordance with and shall be constructed in compliance with the following Building Codes and applicable local bylaws:
 a) Manitoba Building Code 2011
- b) ACI 350-06 Environmental Structures
- c) Where contradictory requirements occur, the most stringent shall apply.
- 2) Principal applied design loads are indicated on appropriate plans.
- 3) All foundation elements are designed as per recommendations in Geotechnical Investigation Report by GENIVAR in their letter report dated February 15, 2013 (Ref.

 # 121-25215-00)
- 4) Importance Category "Normal"
- 5) Design Loads:
 Wind Load (1/50) = 0.45 kPa
 Snow Load: Ss = 1.9 kPa Sr = 0.2 kPa
 Importance Factor = 1.0
 Roof Live Load = 6.0 kPa
 Floor Live Load = 3.6 kPa
 Surcharge Load around chamber = 6.0 kPa
- B. **GENERAL NOTES:**
- 1) Design live loads should not be exceeded at any time during construction.
- 2) Do not scale the drawings.
- 3) Verify all dimensions, elevations, slopes, details, conditions, etc. shown on the structural drawings; with other consultant drawings and the site, prior to construction or prefabrication of any building component.
- 4) Discrepancies or ambiguities on the drawings and/or the site, which affect the structural framing, shall be reported to the Contract Administrator.
- 5) Where an overlap or a duplication occurs on the drawings, the more robust solution shall be considered correct, unless approved otherwise by the Contract Administrator.
- 6) Modifications, alterations or substitutions must be authorized in writing by the Contract Administrator prior to implementation.
- 7) The Contractor shall locate all existing site services prior to start of construction.
- 8) For openings in slabs, floor, walls, roof, etc. refer to Civil and/or other pertinent drawings.
- Location of the construction joints is the responsibility of the Contractor, but approval must be obtained from the Contract Administrator before proceeding.
- 10) The Contractor shall be responsible for the design and installation of all necessary shoring, bracing and formwork. Form work for new construction shall be bridged over existing services. Procedure must be approved by the Contract Administrator.
- 11) Construction safety requirements shall be the responsibility of the Contractor.
- 12) The Contractor shall notify the Contract Administrator at least 48 hours prior to all concrete pours and/or installation of interior sheathing/forming, to allow for site reviews.
- C. EXCAVATION, BACKFILL AND COMPACTION
- 1) To be read in conjunction with CW 2030 and as amended in accordance with these notes.
- 2) Prior to commencing excavation work notify Contract Administrator, establish location and state of use of buried utilities and structures. The Contract Administrator shall have such locations clearly marked to prevent disturbance of the work.
- 3) Confirm location of all buried utilities by careful test excavation.
- 4) Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures
- 5) Where other utility lines or structures exist in the areas of excavation, obtain direction of the civil consultant before
- 6) Record location of maintained, re-routed or abandoned underground lines.
- 7) Confirm locations of recent excavations adjacent to the area of new excavation.
- 8) The shoring Engineer retained and paid for by the Contractor, is responsible to ensure that all the existing utilities and existing building structures are adequately supported to avoid any disruption of service. They shall submit shoring design drawing(s) to the Consultant for approval prior to proceeding with the work. The design and drawings shall be sealed by a Professional Engineer Registered in the Province of Manitoba and holds a current "Certificate of Authorization" of the APEGM.
- 9) Shoring Engineer shall design shoring in accordance with Canadian Construction Safety Code and all applicable local regulations.
- 10) The Contractor shall make good and pay for any damage and be liable for any injury resulting from failure or movement of the shoring, bracing or underpinning at no cost to the City.
- 13) The Contractor shall be responsible to retain pay for a Geotechnical Engineer registered in the Province of Manitoba and who holds a current "Certificate of Authorization" of the APEGM to inspected and approve the sub-grade, prior to placement of concrete. Remove all softened soil encountered and replace with 450mm thick of 150mm down, clean, crushed aggregate followed by 150mm thick of 19mm down base course material. Compact base course uniformly to a minimum 98% standard proctor density.
- 14) Ensure that the sub-grade soil maintains its moisture content to reduce the potential for shrinkage and swelling.
- 15) Compact approved sub-grade uniformly with a heavy vibratory roller to a min. 95% standard proctor density. Apply a skim coat to compacted subgrade followed by a 50mm concrete working base.
- 16) Consult a Geotechnical Engineer registered in the province of Manitoba for the stability of slopes, shoring criteria and any other associated workman's safety requirements when carrying out the excavation and backfill operations.
- 17) The backfill material shall be approved by the geotechnical engineer registered in the Province of Manitoba and holds a "Certificate of Authorization" of the APEGM.
- 18) Do not backfill around exterior walls until the construction of the main and raft slab structures are complete and well cured. Obtain Contract Administrators approval prior to commencing backfilling operations.
- 19) Backfill material shall be placed and compacted in maximum 150mm lifts to 95% Standard Proctor Modified Dry Density, using appropriate compaction equipment.
- 20) Do not backfill on frozen ground or backfill using frozen materials.
- 21) Protect backfilled material, during and after completion of backfill operations from softening due to exposure to excess moisture.
- 22) Keep excavations free of water while work is in progress.
- 23) The Contractor shall not use heavy compaction equipment on top of chamber roof and around the chamber that will exceed the live load or surcharge load as mentioned in A-5

- D. RAFT FOUNDATION
- 1) Valve chamber base slab has been designed for an allowable bearing capacity of 143.7 kPa, as recommended in the Geotechnical Investigation report prepared by GENIVAR, dated February 15, 2013.
- 2) Soils report is available for information only. Examine prevailing conditions at site prior to submitting bid. No extras shall be granted should actual site conditions differ from those indicated.
- 3) Do not cast base slab and piers on frozen soil.
- E. CONCR
- 1) To be read in conjunction with CW 2160 and as amended in accordance with these notes.
- 2) All concrete work shall conform to CSA Standard A23.1 (Latest).
- 3) Concrete Specifications:

COMPONENT	CONCRETE CLASSIFICATION	28-DAY STRENGTH	MAX. AGGREGATE (mm)	ENTRAINED AIR (%)	CONCRETE COVER TO REINF. STEEL (mm)
Interior Pads and Pipe Supports	N	32	20	-	50
Walls	S-1	35	20	4-7	50
Top Structural Slab & Pre-cast Panels	S-1	35	20	4-7	50 Top 50 Bottom
Raft Slabs	S-1	35	20	47	50 Top 75 Bottom
Working Base	S-1	35	10 - 14	4-7	-

- 4) The use of any additives within the concrete mix must be submitted to and be approved by the Contract Administrator prior to construction.
- 5) Vibrate all concrete work with appropriate internal vibrators.
- 6) Concrete working time, from batching to placement and consolidation, shall not exceed 1-1/2 hours
- 7) Concrete Contractor should place all components to be embedded in the concrete (ie. weld plates, dowels for concrete and/or masonry, anchor bolts, inserts, water stop bars, sleeving, etc.). See structural drawings, specifications and shop drawings as well as any other pertinent drawings.
- 8) Install water stop bar in all wall joints.
- 9) See general notes regarding site review notification.
- 10) The Contractor shall ensure that concrete testing be performed by a C.S.A. approved independent testing company. Three concrete test cylinders and one slump test shall be taken for every 30 (or less) cubic meters, or each day concrete is placed, whichever is greater. Testing shall be performed in accordance with CSA Standard A23.2 (latest), and the results shall be forwarded to the Contract Administrator.
- 11) Under ideal weather conditions, allow minimum curing time as scheduled below before removing formwork:

- 12) See Cold—Weather Concreting notes for additional requirements
- Submit following documents as a minimum with proposed mix design. Contract Administrator may request for additional documents as required by Table 5 Alternative Methods for Specifying Concrete, CSA A23.1—09.
 Copy of certificate showing the valid member of Manitoba Ready Mix Concrete Association (MRMCA).
 Copy of testing results by an independent testing company for all materials used in the mix showing that they comply with the CSA 23.1—09/CSA-23.2—09 requirements.
 Provide documentation demonstrating the proposed mix design will achieve the required strength, durability, and
- F. COLD WEATHER CONCRETING

performance requirements.

-) This section applies when the average daily (24 hour) temperature is less than +5°C and the maximum duration of temperature of +10°C (and greater) is less than 12hours within the same 24 hour period.
- 2) Maintain concrete temperature between +10°C to +30°C from the time of batching to the end of the specified curing period. See Note 4.
- 3) All surfaces (formwork, rebar, grade, previous pours, etc.) against which new concrete is to be installed, shall be free of ice, snow and frost, and shall be pre—heated to +10°C (minimum) for a least 24 hours prior to concrete placement.
- 4) Provide enclosures, insulating blankets, heaters, etc. as necessary to maintain minimum concrete temperatures during the curing period as follows:

 -7 days at +10°C
- -7 days at +10°C
 -Additional days at +10°C as required until concrete has gained 75% of its specified compressive strength.
 -At no time shall concrete temperature exceed +30°C
- 5) Provide adequate venting for all heaters burring fossil fuels to prevent carbon dioxide and carbon monoxide buildup, which would result in health problems and poor concrete surfaces.
- 6) Make one (1) additional cylinder for every set of cylinders made, which will be field cured in the same environment as the concrete poured, and test at 7 days.

- G. REINFORCING STEEL:
- 1) To be read in conjunction with CW 2160 and as amended in accordance with these notes.
- 2) Reinforcing steel shall be new billet, deformed bars in accordance with CSA Standard G30.18. Minimum yield
- 3) Reinforcing steel shall be detailed in accordance with the latest A.C.I. Detailing Manual.
- 4) Lap top bars at center span and bottom bars over supports.
- 5) All reinforcing to be held in place and tied securely by the use of purpose made accessories such as hi—chairs, spacers, tie wire etc., to be supplied by the reinforcing steel fabricator.
- 6) Reinforcing in concrete beams/walls to be bent minimum 600mm around corners or as indicated on the design drawings.
- 7) Frame all openings in concrete beams, walls and/or slabs with 2-20M bars (extra) at each face at all 4 sides. Extend bars 600mm beyond edges of opening except as noted. Provide 2-15Mx1500 long diagonal bars at each face at corners of openings in walls. For 750ø pipe penetrations in wall, extend additional vertical reinforcing bars to full height c/w matching dowels at bottom raft slab.
- 8) Submit shop drawings which clearly indicate bar sizes, grade, spacing, hooks, bends and supporting/spacing devices, etc., for review to the Contract Administrator prior to fabrication of the reinforcing steel.
- 9) Prior to placing concrete, ensure that all reinforcing steel is clean, free of loose scale, rust, mud, oil or other foreign material which would reduce the bond.
- 10) Heating, quenching and bending of reinforcing steel on the site is not allowed.
- H. STRUCTURAL STEEL
- Structural steel shall conform to CSA Standard G40.20 / G40.21-300W for plates and angles and to G40.20 / G40.21-350W for remainder.
- 2. Fabrication and erection shall conform to CSA Standard S16 (Latest Edition).
- 3. All welding shall be performed by qualified welders fully approved for structural welding by the Canadian Welding Bureau in accordance with CSA Specifications W47 and W59.
- 4. Design and fabricate all connections for the full strength of the member.
- 5. Splicing of members is not permitted unless otherwise noted.
- 6. Supply all components with 1 coat of shop primer conforming to C.I.S.C./C.P.M.A. 1—73A or equivalent unless noted otherwise.
- 7. Structural steel erector shall supply and install all temporary guying and bracing necessary to provide stability for the structure as a whole. These shall remain in place until roof slab is well cured or permanent bracing is
- 8. Structural steel supplier shall submit shop drawings sealed by a professional engineer registered in the Province of Manitoba and who holds an APEGM "Certificate of Authorization", showing all design and fabrication details of connections to the Contract Administrator for approval prior to start of fabrication.

DESIGN ELEVATIONS

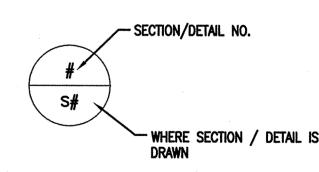
-TOP OF VALVE CHAMBER ROOF SLAB = 231.580

-TOP OF VALVE CHAMBER RAFT SLAB = 228.665

-CONFIRM ALL ELEVATIONS WITH LATEST CML DRAWINGS PRIOR TO CONSTRUCTION.

ABBREVIATIONS LEGEND

REINFORCING ALTERNATE ELEVATION DOWEL FOOTING BEAM COLUMN SP'S. SPACES VERTICAL GALVANIZED HOR. HORIZONTAL TYPICAL C/W COMPLETE WITH UNDERSIDE REINFORCE WITH EACH WAY OPENING EACH FACE EXIST. EXISTING EACH END T.U.L. TOP UPPER LAYER INSIDE FACE TOP LOWER LEVEL OUTSIDE FACE BOTTOM UPPER TOP OF BOTTOM BOTTOM LOWER LONG. LONGITUDINA TRANS. TRANSVERSE CENTER LINE T.S. TEMPERATURE AND T & B - TOP AND BOTTOM SHRINKAGE LONG LEG VERTICAL REINFORCING LONG LEG S.S. STAINLESS STEEL HORIZONTAL U/N UNLESS NOTED LIVE LOAD MAXIMUM DEAD LOAD MINIMUM



SECTION/DETAIL IDENTIFICATION

METRIC
WHOLE NUMBERS INDICATE MILLIMETERS
DECIMALIZED NUMBERS INDICATE METERS

Certificate of Authorization
GENIVAR Inc.
No. 5079 Date: February 26, 2013

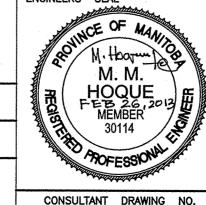
SUPV. U/G STRUCTURES DATE COMMITTEE

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.

LOCATION APPROVED

UNDERGROUND STRUCTURES



121-25215-00-S3

BID OPPORTUNITY: 181-2013

Winnipeg

THE CITY OF WINNIPEG WATER AND WASTE DEPARTMENT

2013 FEEDERMAIN INSTALLATION AND ASSOCIATED WORKS
KENASTON BOULEVARD
OFFTAKE VALVE CHAMBER

STRUCTURAL NOTES

CITY DRAWING NO.

SHEET 10 of 10

D-13156