

GENERAL NOTES:

- THIS COMPLETED STRUCTURE HAS BEEN DESIGNED AND SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF PART 9 OF THE MANITOBA BUILDING CODE-2024 & NATIONAL BUILDING CODE OF CANADA-2020.
- ALL STANDARDS AND CODES SPECIFIED SHALL BE THE LATEST REVISION AVAILABLE.
- DO NOT SCALE THE DRAWINGS. SITE VERIFY ALL DIMENSIONS, ELEVATIONS, DETAILS, QUANTITIES AND CONDITIONS PRIOR TO START OF ANY DEMOLITION, CONSTRUCTION OR PREFABRICATION OF ANY STRUCTURAL COMPONENT.
- THE STRUCTURAL DRAWINGS SHOW THE COMPLETED STRUCTURE. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY AND SAFETY OF THE STRUCTURE DURING CONSTRUCTION. THE CONSTRUCTIONS LOADS SHALL NOT EXCEED THE LOADS SHOWN ON THE STRUCTURAL DRAWINGS.
- EXISTING STRUCTURAL SUPPORTS WHICH INTERFERE WITH NEW WORK SHALL BE RELOCATED UPON APPROVAL BY THE DESIGN ENGINEER.
- DO NOT CUT OR DRILL ANY OPENINGS IN STRUCTURAL MEMBERS WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER OF RECORD.
- THE CONTRACTOR SHALL ENSURE THAT ALL BURIED SERVICES ARE LOCATED AND MARKED PRIOR TO EXCAVATION.
- REFER TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATIONS AND DIMENSIONS OF OPENINGS AND SLEEVES NOT SHOWN ON STRUCTURAL DRAWINGS.
- REFER TO ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR THE LOCATIONS AND DIMENSIONS OF PITS, EQUIPMENT BASES, SUMP PITS, DEPRESSIONS, GROOVES, CURBS, CHAMFERS AND SLABS NOT SHOWN ON THE STRUCTURAL DRAWINGS.
- ALL BUILDING SYSTEMS COMPONENTS SHALL BE THE PRODUCTS OF A SINGLE MANUFACTURER UNLESS SPECIFIED OTHERWISE.
- SHIP, STORE, HANDLE, ERECT, INSTALL, ETC. ALL BUILDING MATERIALS, COMPONENTS, FIXTURES, EQUIPMENT, ETC. AS PER MANUFACTURER'S WRITTEN INSTRUCTIONS.
- ALL DEMOLITION, FABRICATION, CONSTRUCTION, ETC. SHALL BE CARRIED OUT IN ACCORDANCE WITH ALL PERTINENT BUILDING CODES, AND LOCAL BYLAWS AND ORDINANCES.
- EACH TRADE SHALL BE RESPONSIBLE TO PROVIDE ADEQUATE PROTECTION FOR THE EXISTING FACILITY/PROPERTY TO PREVENT PHYSICAL DAMAGE AND LOSS OF VALUE OR USE OF ANY KIND, AS A RESULT OF DEMOLITION, CONSTRUCTION AND RELATED ACTIVITIES.
- TIME AND DURATION OF ANY NECESSARY DISRUPTION IN THE USE OF ANY ROOM, SPACE, SERVICE, EQUIPMENT, ETC. SHALL BE COORDINATED WITH, AND APPROVED BY THE OWNER AT THE START OF THE PROJECT. PROVIDE OWNER WITH MINIMUM ONE WEEK NOTICE (OR AS REQUIRED) PRIOR TO EACH ACTUAL OCCURRENCE.
- THE CONTRACTOR SHALL BE RESPONSIBLE TO NOTIFY THE OWNER AND THE DESIGN ENGINEER OF ANY PREVIOUSLY UNNOTICED PRE-EXISTING FLAW OR CONDITION THAT MIGHT INCREASE THE SCOPE OF WORK OR COMPROMISE NEW CONSTRUCTION, PRIOR TO THE START OF DEMOLITION AND CONSTRUCTION, OR AS SOON AS IT IS DISCOVERED.
- THE CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD FOR SITE REVIEWS AT LEAST 48 HOURS PRIOR TO CONCEALING THE STRUCTURAL SCOPE OF WORK.
- DESIGN OF NON-STRUCTURAL OR SECONDARY STRUCTURAL ELEMENTS ARE NOT PART OF THE STRUCTURAL DESIGN SHOWN ON THE STRUCTURAL DRAWINGS. THE DESIGN AND FIELD REVIEW SHALL BE COMPLETED BY A THIRD PARTY STRUCTURAL ENGINEER SPECIALIZING IN THESE ELEMENTS. PREPARE ALL SUBMITTALS UNDER SEAL AND SIGNATURE AND PROVIDE REQUIRED LETTERS TO BUILDING PERMIT AUTHORITIES. EXAMPLES OF NON-STRUCTURAL ELEMENTS INCLUDE, BUT ARE NOT LIMITED TO:
 - ARCHITECTURAL COMPONENTS SUCH AS GUARDRAILS, HANDRAILS, CEILING, MILLWORK, FLAG POSTS, ETC.
 - LANDSCAPING ELEMENTS SUCH AS BENCHES, LIGHT POSTS, PLANTERS, ETC.
 - CLADDING, GLAZING, INTERIOR STUD WALLS AND EXTERIOR STUD WALLS.
 - ARCHITECTURAL PRECAST CLADDING.
 - MECHANICAL AND ELECTRICAL EQUIPMENT, COMPONENTS AND ALL ATTACHMENTS.
 - FALL PROTECTION AND FALL ARREST SYSTEMS AND ALL ATTACHMENTS.
 - BRICK AND BLOCK VENEERS AND ALL ATTACHMENTS.
 - DESIGN AND SITE REVIEW OF SEISMIC RESTRAINT FOR SECONDARY STRUCTURAL ELEMENTS OF MECHANICAL AND ELECTRICAL EQUIPMENT.

- THE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE PROJECT TECHNICAL SPECIFICATIONS AND ALL OTHER CONTRACT DRAWINGS AND DOCUMENTS.
- ENGINEER OF RECORD SHALL REVIEW SHOP DRAWINGS PERTAINING TO THE WORK SHOWN ON THESE DRAWINGS. THE REVIEW OF THE SHOP DRAWINGS IS FOR THE SOLE PURPOSE OF ASCERTAINING CONFORMANCE WITH THE GENERAL DESIGN CONCEPT AND IS NOT AN APPROVAL OF THE DETAILED DESIGN INHERENT IN THE SHOP DRAWINGS. THE SHOP DRAWINGS SHALL BE COMPLETE AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED TO PRACTICE IN MANITOBA AND SHALL BE APPROVED BY THE CONTRACTOR, PRIOR TO SUBMITTAL.

20. FOUNDATIONS HAVE BEEN DESIGNED IN ACCORDANCE TO THE RECOMMENDATIONS IN KGS GROUP REPORT: TRANSIT COMFORT STATIONS - GEOTECHNICAL ENGINEERING REPORT, DATED DECEMBER 15, 2025.

EXCAVATION & BACKFILL:

- REMOVE ALL FILL MATERIALS, DELETERIOUS SOILS AND ORGANICS IN AREAS REQUIRING GRANULAR BASE MATERIALS. COMPACT SUBGRADE TO 95% STANDARD PROCTOR DENSITY. SUB-EXCAVATE AND REPAIR ALL AREA EXHIBITING UNSUITABLE DEFLECTIONS.
- GRANULAR BASE TO BE PLACED ON GRADE SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY IN MAXIMUM 150mm (6") LIFTS.
- DO NOT COMPACT FROZEN BACKFILL OR PLACE ON FROZEN SUBGRADE.
- SUB-GRADE, SUB-BASE AND BASE COURSE MATERIALS AND CONSTRUCTION METHODS SHALL BE AS PER CITY OF WINNIPEG SPECIFICATION CW3110, SPECIFICATION UNLESS NOTED.
- SUBGRADE AND BASE COURSE INSTALLATION SHALL BE INSPECTED AND APPROVED BY OWNER'S GEOTECHNICAL ENGINEER, REGISTERED IN THE PROVINCE OF MANITOBA, AT CONSTRUCTION PHASES AS DETERMINED BY THE GEOTECHNICAL ENGINEER, BEFORE WORK IS TO COMMENCE.

DESIGN LOADING:

THIS COMPLETED STRUCTURE HAS BEEN DESIGNED AND SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF PART 4 OF THE MANITOBA BUILDING CODE-2024, NATIONAL BUILDING CODE OF THE CANADA-2020.

LOCATION: WINNIPEG, MANITOBA

ROOF DEAD LOAD:	1.0 kPa
SNOW LOAD:	1.72 kPa
WALL DEAD LOAD:	1.0 kPa
FLOOR DEAD LOAD:	4.6 kPa
FLOOR LIVE LOAD:	4.8 kPa
WIND LOAD:	1.0 kPa

SEISMIC DESIGN DATA:

Sa(0.2, XD)	= 0.104
Sa(0.5, XD)	= 0.091
Sa(1.0, XD)	= 0.046
Sa(2.0, XD)	= 0.018
Sa(5.0, XD)	= 0.004
Sa(10.0, XD)	= 0.001
PGA(XD)	= 0.062
PGV(XD)	= 0.047

MAXIMUM FACTORED PILE LOADS (TYP. FOR ALL PILES, APPLIED AT TOP OF PILE)			
MARK	AXIAL Fz (kN) (DOWNWARD)	HORIZONTAL Fx (kN)	AXIAL Fz (kN) (UPWARD) *
P-1	50	3.0	50

* NET, BASED ON 100 kPa ADFREEZE (AS PER GEOTECH REPORT) AND ASSUMED 102mm DIA. PILE SHAFT, AND MINIMUM FACTORED (0.9) DEAD LOAD OF 12 kN. ALTERNATIVELY, IF MECHANISM TO REDUCE ADFREEZE, UPLIFT LIKE SLEEVING, IS UTILIZED, THE REQUIRED UPLIFT RESISTANCE CAN BE CORRESPONDINGLY REDUCED.

HELICAL PILE NOTES:

- LOCATIONS OF ALL UNDERGROUND PIPING LINES AND UTILITIES WHICH MAY INTERFERE WITH PILES SHOULD BE VERIFIED PRIOR TO DRILLING. OBTAIN ALL NECESSARY PERMITS PRIOR TO PILE INSTALLATION. SHOULD ANY INTERFERENCE OCCUR, THE CONTRACTOR SHALL NOTIFY OWNER BEFORE DRILLING COMMENCES OR CONTINUES.
- HELICAL PILES TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:
 - CAN/CSA S16.1-01 (R2019) LIMIT STATES DESIGN OF STEEL STRUCTURES;
 - CSA G40.20-13/G40.21-13 (R2108) GENERAL REQUIREMENTS FOR ROLLED OR WELDED STRUCTURAL QUALITY STEEL / STRUCTURAL QUALITY STEEL;
 - CSA S136-16 NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF COLD FORMED STRUCTURAL STEEL MEMBERS;
 - CSA W47.1-19 CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL;
 - CSA W48-18 FILLER METALS AND ALLIED MATERIALS FOR METAL ARC WELDING;
 - CSA W55.3-08 (R2018) CERTIFICATION OF COMPANIES FOR RESISTANCE WELDING OF STEEL AND ALUMINUM;
 - CSA W59-18 WELDED STEEL CONSTRUCTION(METAL ARC WELDING);
 - ASTM A36-19/A36M-19 STANDARD SPECIFICATION FOR CARBON STRUCTURAL STEEL;
 - ASTM A252-19 STANDARD SPECIFICATION FOR WELDED AND SEAMLESS STEEL PIPE PILES;
 - ASTM A500-21a/A500M-21a STANDARD SPECIFICATION FOR COLD-FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUND AND SHAPES;
 - NATIONAL BUILDING CODE OF CANADA (NBCC 2010);
 - MANITOBA BUILDING CODE (MBC 2011)
 - CANADIAN FOUNDATION ENGINEERING MANUAL (CFEM) 4TH EDITION, 2006.
- THE PILE HELICES SHALL BE INSTALLED TO A MINIMUM DEPTH OF 4.0m AND SHALL BE INSTALLED TO A TORQUE VALUE NECESSARY TO ACHIEVE THE FACTORED LIMIT STATES ULS LOAD CAPACITY SPECIFIED ON THE DRAWINGS.
- ALL PIPES USED FOR PILING SHALL BE IN ACCORDANCE WITH ASTM A252 GRADE 2 OR 3 OR A106 GRADE B OR C.
- PRIOR TO INSTALLATION, THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SEALED BY AN ENGINEER LICENSED TO PRACTICE IN THE PROVINCE OF MANITOBA THAT INDICATE THE FOLLOWING:
 - THE LOCATION OF THE PROJECT.
 - GENERAL ARRANGEMENT OF PILES.
 - DIMENSIONAL DEFINITION OF THE SCREW PILES. MATERIAL AND FINISHES OF THE SCREW PILES.
 - THE SLS AND ULS LOAD RESISTANCES FOR COMPRESSION, UPLIFT AND LATERAL MODES.
 - CORROSION PROTECTION REQUIREMENTS (SACRIFICIAL LAYER, SACRIFICIAL ANODE, GALVANIZING, ETC) TO ENSURE THE PILES ACHIEVE A DESIGN LIFE OF 75 YEARS, OR AS DIRECTED BY THE OWNER.
 - CONNECTION DETAILS.
 - DIAMETER AND THICKNESS OF PIPE AND HELIX.
 - PILE DEPTH.
 - NUMBER AND SPACING OF HELICES.
 - CAP BRACKET DETAILS.
- POST INSTALLATION, THE CONTRACTOR SHALL SUBMIT A CONFIRMATION REPORT, SEALED BY AN ENGINEER LICENSED TO PRACTICE IN THE PROVINCE OF MANITOBA, CONFIRMING THE PILE INSTALLATION UPON COMPLETION, SPECIFICALLY NOTING THAT THE ASSUMED DESIGN SOIL CONDITIONS WERE MET AND THE PROPER INSTALLATION CRITERIA AND FACTORED MAX PILE LOADS NOTED IN THE DRAWING WERE ATTAINED. REPORT TO ALSO INCLUDE:
 - PILE TYPE.
 - PILE INSTALLATION DEPTH.
 - PILE INSTALLATION TORQUE.
 - LOAD CAPACITY ACHIEVED.
 - INSTALLATION LOGS.
 - LAYOUT PLANS (IF DEVIATIONS ON SITE OCCURRED).
 - FINAL PILE SHOP DRAWINGS (IF DEVIATIONS ON SITE OCCURRED).
- THE CONTRACTOR SHALL NOTIFY OWNER IMMEDIATELY OF ANY PILE NOT IN CONFORMANCE WITH THE DRAWINGS AND THESE SPECIFICATIONS.
- ALL PIPE SPLICES SHALL BE DESIGNED BY THE HELICAL PILE SUPPLIER FOR THE LOADS INDICATED ON THE DRAWINGS AND FORCES EXERTED DURING INSTALLATION.
- WELDING PROCEDURE AND WELDER QUALIFICATION SHALL CONFORM TO CSA W59 AND CSA W47.1. WELDING ELECTRODES SHALL BE E48018 CLASSIFICATION CONFORMING TO CSA W48.1.

CONCRETE:

- CONCRETE MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH CSA A23.1-19. SEE BELOW FOR MIX REQUIREMENTS.
 - ADMIXTURES SHALL NOT BE USED UNLESS SPECIFIED HEREIN OR APPROVED BY THE DESIGN ENGINEER. CALCIUM CHLORIDE SHALL NOT BE USED.
 - MIX WATER SHALL BE POTABLE.
 - DESIGN, FABRICATE AND ERECT FORMWORK/SHORING IN ACCORDANCE WITH CAN/CSA-S269-1-16. ALLOW SUFFICIENT CONCRETE CURING TIME PRIOR TO REMOVAL.
 - CONCRETE FINISHING SHALL MEET THE REQUIREMENTS OF CSA A23.1-19.
 - FORM RELEASE AGENT SHALL BE BIODEGRADABLE, NON-STAINING AND NON-VOLATILE.
 - PROVIDE ADEQUATE COLD/HOT WEATHER PROTECTION AS REQUIRED DURING CURING PERIOD.
 - 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.
 - 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.
 - ALL EXPOSED CORNERS TO HAVE 25mm CHAMFER FILLET UNLESS NOTED.
 - CAST-IN-PLACE ANCHOR BOLTS SHALL MEET REQUIREMENTS OF CSA G40.20/G40.21 OR ASTM F1554-18, GRADE 36.
 - EXPANSION ANCHORS SHALL BE HILTI KWIK-BOLTS OR APPROVED EQUAL, UNLESS NOTED. INSTALL AS PER MANUFACTURER'S INSTRUCTIONS.
 - ADHESIVE ANCHORS SHALL BE HAS RODS W/ HILTI HIT-HY 200 ADHESIVE OR APPROVED EQUAL, UNLESS NOTED. INSTALL AS PER MANUFACTURER'S INSTRUCTIONS.
 - POST-INSTALLED ANCHOR SHALL BE INSTALLED BY QUALIFIED PERSONNEL IN STRICT COMPLIANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND CSA A23.3-19. INSTALLATION OF ADHESIVE ANCHORS SHALL BE PERFORMED BY PERSONNEL TRAINED TO INSTALL ADHESIVE ANCHORS.
 - GROUT REINFORCING DOWELS WITH EPOXY ADHESIVE HILTI HIT-HY 200, OR APPROVED EQUAL. INSTALL ALL ADHESIVE AS RECOMMENDED BY MANUFACTURER.
 - BONDING AGENTS SHALL BE USED TO ADHERE NEW CONCRETE TO EXISTING CONCRETE OR STEEL. ACCEPTABLE PRODUCT: SIKADUR 32 HI-MOD (EPOXY), SIKA LATEX R (ACRYLIC, MIX INTO GROUT) OR APPROVED EQUAL.
 - THE CONCRETE SUPPLIER SHALL BE CERTIFIED TO MEET THE REQUIREMENTS OF CSA A23.1-19.
 - THE CONCRETE SUPPLIER SHALL SUBMIT CONCRETE MIX DATA SUBMISSION FORMS FOR EACH TYPE OF CONCRETE SPECIFIED FOR REVIEW PRIOR TO BATCHING ANY CONCRETE.
 - CONCRETE STRENGTH TESTS SHALL BE ARRANGED BY THE CONTRACTOR. PROVIDE ONE SET OF TEST CYLINDERS IN ACCORDANCE WITH CSA A23.1-19 FOR EVERY 50 CUBIC METERS OF CONCRETE PLACED AND A MINIMUM OF ONE SET PER STRUCTURAL COMPONENT.
- FOUNDATION WALLS (INTERIOR FACE) 38mm
 GRADE BEAMS (SIDES) 38mm
 GRADE BEAMS (BOTTOM) 50mm
 SLAB-ON-GRADE (TOP) 50mm
 SLAB-ON-GRADE (BOTTOM) 50mm
 STRUCTURAL SLAB (TOP & BOTTOM) 25mm

B.M. N/A ELEV. N/A	COORDINATE SYSTEM: N/A	KGS GROUP		ENGINEER'S SEAL	
				DESIGNED BY	CHECKED BY
		DRAWN BY	APPROVED BY	CONSULTANT DRAWING NO. 25-0107-004-500	
		SCALE: AS NOTED	RELEASED FOR CONSTRUCTION:		
NO.	REVISIONS	DATE	BY	DATE	YY/MM/DD

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

WOOD FRAMING:

- FRAMING LUMBER SHALL BE GRADED IN ACCORDANCE WITH NATIONAL LUMBER GRADES AUTHORITY "STANDARD GRADING RULES FOR CANADIAN LUMBER-2022".
- MINIMUM GRADES TO BE AS FOLLOWS:

COMPONENT	GRADE
ROOF JOISTS/RAFTERS	S-P-F NO. 1/2
LINTELS	D. FIR NO. 1/2
STUDS AND PLATES (U/N)	S-P-F NO. 1/2
- LUMBER MOISTURE CONTENT NOT TO EXCEED 19%.
- SHEATHING TO BE EXTERIOR GRADE AS SCHEDULED UNLESS NOTED.

LOCATION	THICKNESS/GRADE	INSTALLATION
FLOORS	19mm O.S.B.	GLUE & SCREW
WALLS	13mm O.S.B.	NAIL
ROOF	13mm O.S.B.	NAIL
- MINIMUM FRAMING REQUIREMENTS TO BE IN ACCORDANCE WITH PART 9 "WOOD FRAME CONSTRUCTION" SECTION OF THE MANITOBA BUILDING CODE OF CANADA-2024.
- CUT LUMBER NEAT AND SQUARE PROVIDING FULL SURFACE CONTACT WITH ADJOINING MEMBERS.
- PROVIDE METAL HANGERS AT ALL FLUSH CONNECTIONS AND AS DETAILED.
- CARPENTRY CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLY AND ERECTION OF TEMPORARY GUYING AND BRACING TO ENSURE STABILITY OF THE STRUCTURE AS A WHOLE. THESE SHALL REMAIN IN PLACE UNTIL ALL SHEATHING AND PERMANENT BRACING IS INSTALLED.
- PROVIDE MINIMUM 48 HOURS NOTICE FOR FRAMING INSPECTION PRIOR TO CLOSING IN.

CONCRETE MIX DESIGNS:

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

GRADE BEAMS, FOUNDATION WALLS & PIERS:	EXPOSURE CLASS MIN. 28 DAY COMP. STRENGTH MIN. 56 DAY COMP. STRENGTH AIR CONTENT CATEGORY	S-2 30 MPa 32 MPa 1
EXTERIOR SLABS (STRUCTURAL):	EXPOSURE CLASS MIN. 28 DAY COMP. STRENGTH AIR CONTENT CATEGORY	C-1 35 MPa 1
INTERIOR CONCRETE, ALL SLABS & CURBS:	EXPOSURE CLASS MIN. 28 DAY COMP. STRENGTH	N-CF 30 MPa



PROJECT TITLE	SHEET OF
TRANSIT COMFORT STATIONS AND REDONDA LOOP UPGRADE	1 3
STRUCTURAL GENERAL NOTES	COMPUTER FILE NAME 25-0107-004_S00.DWG
	CITY DRAWING NUMBER N/A