GENERAL

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH CONTRACT SPECIFICATIONS.
2. THE METRIC SYSTEM OF MEASUREMENT IS USED ON ALL DRAWINGS. ELEVATIONS AND STATIONS ARE SHOWN IN METERS AND ALL OTHER DIMENSIONS ARE SHOWN IN MILLIMETERS.
3. CONTRACTOR MUST VERIFY ALL EXISTING GEOMETRY AS WELL AS PROPOSED DIMENSIONS AND LAYOUT IN THE FIELD PRIOR TO FABRICATION AND CONSTRUCTION. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION.
4. ALL REFERENCES TO CODES, STANDARDS, SPECIFICATIONS, GUIDELINES, ETC., SHALL MEAN THE LATEST EDITION.
5. THE CONTRACTOR IS RESPONSIBLE FOR SAFETY IN AND ABOUT THE JOB SITE DURING CONSTRUCTION. EXCEPT WHERE INDICATED OTHERWISE, THESE DRAWINGS SHOW DETAILS FOR THE COMPLETED STRUCTURE. THE CONTRACTOR IS RESPONSIBLE FOR DESIGN AND STABILITY OF ANY TEMPORARY WORKS DURING CONSTRUCTION. CONSTRUCTION METHODS REQUIRING THE TEMPORARY INSTALLATION OF COFFER DAMS, SHORING, SCAFFOLDING, BRACING, ETC. SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR FOR REVIEW AND ACCEPTANCE PRIOR TO PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL RETAIN A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF MANITOBA TO PERFORM AND TAKE RESPONSIBILITY FOR ANY SUCH DESIGNS NECESSARY TO COMPLETE THE CONSTRUCTION AND AS REQUIRED BY THE CONTRACT DOCUMENTS.

STRUCTURAL DESIGN DATA

1. DESIGN SPECIFICATION:
   CAN/CSA-S6-14 "CANADIAN HIGHWAY BRIDGE DESIGN CODE"
2. LIVE LOAD:
   CL-625 TRUCK AND CL-625 LANE LOAD
3. DESIGN LIFE:
   75 YEARS
4. CONCRETE BARRIER COLLISION PERFORMANCE RATING:
   TL-2

TRANSPORTATION DESIGN DATA

1. DESIGN SPECIFICATIONS:
   CITY OF WINNIPEG TRANSPORTATION STANDARDS (2012 UPDATE)

   TRANSPORTATION ASSOCIATION OF CANADA GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS
2. ROADWAY DESIGN CRITERIA:

ROADWAY CLASSIFICATION:	LOCAL RESIDENTIAL
POSTED SPEED:	50 km/h
DESIGN SPEED:	50 km/h

GEOTECHNICAL DESIGN DATA

1. A GEOTECHNICAL REPORT HAS BEEN PREPARED BY KGS GROUP CONSULTING ENGINEERS TITLED "TRURO CREEK CULVERT REPLACEMENT GEOTECHNICAL INVESTIGATION AND ASSESSMENT" DATED JULY 2017. REFER TO GEOTECHNICAL REPORT FOR DETAILED DESIGN DATA AND RECOMMENDATIONS.
2. EXCAVATION SLOPES SHOWN BASED ON PRELIMINARY ENGINEERING FOR THE PURPOSE OF SCOPING WORK AND DEVELOPING QUANTITIES.
3. THE CONTRACTOR SHALL SUBMIT AN EXCAVATION AND DEMOLITION PLAN WHICH INCLUDES A DESCRIPTION OF THE EXCAVATION METHODOLOGY AND EQUIPMENT, STOCKPILING LOCATIONS, AND THE PROCESS AND RATE OF REMOVALS OF EXCAVATED AND DEMOLISHED MATERIAL. THE SUBMITTAL SHALL INCLUDE AN ASSESSMENT OF THE IMPACT OF SURCHARGE LOADS INTRODUCED BY CONSTRUCTION ACTIVITIES ON THE STABILITY OF THE EXCAVATION, AND SHALL INCLUDE SLOPE STABILITY ANALYSIS SIGNED AND SEALED BY A GEOTECHNICAL ENGINEER LICENSED TO PRACTICE IN THE PROVINCE OF MANITOBA.
4. BEARING CAPACITY:

ULTIMATE LIMIT STATES BEARING CAPACITY	=	200 kPa
SERVICEABILITY LIMIT STATES BEARING CAPACITY	=	80 kPa

5. EARTH LOAD:

ACTIVE EARTH PRESSURE COEFFICIENT, K_a	=	0.27
AT REST EARTH PRESSURE COEFFICIENT, K_o	=	0.43

6. DESIGN BACKFILL SOIL DENSITY ASSUMED TO BE 22.5 kN/m^3.

HYDRAULIC DESIGN DATA

1. A HYDRAULIC REPORT HAS BEEN PREPARED BY KGS GROUP CONSULTING ENGINEERS TITLED "TRURO CREEK CULVERTS ON WINCHESTER ST., LINWOOD ST. AND NESS AVE. HYDRAULIC DESIGN REPORT" DATED JULY 2017. REFER TO HYDRAULIC REPORT FOR DETAILED DESIGN DATA AND RECOMMENDATIONS.
2. SELECT HYDRAULIC DESIGN DATA:

DESIGN FLOW	=	6.0 m^3/s
3Q10	=	1.2 m^3/s
DESIGN VELOCITY	=	1.0 m/s

ENVIRONMENTAL PROTECTION

1. NO IN-STREAM WORK IS PERMITTED BETWEEN APRIL 1 AND JUNE 15.
2. IMPLEMENT ENVIRONMENTAL PROTECTION MEASURES AS DESCRIBED BY THE CONTRACT SPECIFICATIONS.

EXISTING UTILITY PROTECTION

1. SEVERAL UTILITIES ARE BURIED BELOW THE WORK ZONE, INCLUDING BUT POTENTIALLY NOT LIMITED TO: 50 GAS, 150 PVC WATER MAIN, 375 PVC COMBINED SEWER, 300 CONCRETE COMBINED SEWER, STREET LIGHTING POWERLINES, TRAFFIC SIGNALS, AND UNKNOWN LAND DRAINAGE SEWER (ABANDONED).
2. CONTRACTOR SHALL VERIFY ALL EXISTING ABOVE GROUND AND BELOW GROUND UTILITIES, AND REPORT ANY DISCREPANCIES OR CONFLICTS TO THE CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION. ANY DAMAGE TO EXISTING STRUCTURES AND UTILITIES BY THE CONTRACTOR'S OPERATIONS MUST BE REPAIRED BY THE CONTRACTOR AT HIS OWN COST.
3. THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION METHOD STATEMENT DEMONSTRATING ADHERENCE TO THE OPERATING CONSTRAINTS FOR WORK IN CLOSE PROXIMITY TO ALL BURIED AND OVERHEAD UTILITIES.

CAST IN PLACE CONCRETE

1. TO BE READ IN CONJUNCTION WITH CW 2160 AND AS AMENDED IN ACCORDANCE WITH THESE NOTES.
2. CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF CSA A23.1.
3. ALL CEMENTITIOUS MATERIAL SHALL BE IN ACCORDANCE WITH CSA A3001-13.
4. ALL CAST-IN-PLACE CONCRETE SHALL HAVE THE FOLLOWING PROPERTIES:

SUBSTRUCTURE: (BELOW CONSTRUCTION JOINT AT TOP OF WALLS)	35 MPa AT 28 DAYS CSA A23.1-14 EXPOSURE CLASS S-1 CEMENT TYPE HS CATEGORY 2 AIR ENTRAINMENT
SUPERSTRUCTURE: (ALL OTHER)	35 MPa AT 28 DAYS CSA A23.1-14 EXPOSURE CLASS C-1 CEMENT TYPE GU CATEGORY 1 AIR ENTRAINMENT

5. CONCRETE CLEAR COVER TO REINFORCING STEEL SHALL BE AS FOLLOWS:

BOTTOM OF CULVERT FLOOR SLAB, BOTTOM OF APPROACH SLABS, BACKFILL FACE AND BOTTOM FACE OF WING WALLS AND HEAD WALLS	75 mm
ALL OTHER UNLESS NOTED OTHERWISE	60 mm

6. ALL EXTERIOR CORNERS SHALL BE CHAMFERED 20 mm.
7. WORKING BASE SHALL BE LEAN MIX CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 20 MPa AT 28 DAYS.

REINFORCING STEEL

1. TO BE READ IN CONJUNCTION WITH CW 2160 AND AS AMENDED IN ACCORDANCE WITH THESE NOTES.
2. ALL REINFORCING STEEL SHALL CONFORM TO CSA G30.18M, GRADE 400W.
3. THE MINIMUM LAP LENGTH FOR ALL REINFORCING STEEL SHALL MEET CAN/CSA S6, CLASS B.

BAR SIZE	LAP LENGTH
15M	740
20M	900
25M	1 450

4. REINFORCING STEEL LAPS SHALL BE STAGGERED UNLESS NOTED OTHERWISE.

MISCELLANEOUS METAL

1. EXTRUDED ALUMINUM SHAPES AND PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM B221, ALLOY 6061-T6 OR ALLOY 6351-T5 (MINIMUM ELONGATION 10%).
2. THE STAINLESS STEEL HEX HEAD AND SOCKET HEAD CAP SCREWS SHALL MEET THE REQUIREMENTS OF ASTM A276, TYPE 430, AND THE DIMENSIONAL REQUIREMENTS OF ANSI B18.3.
3. DIMENSIONAL TOLERANCES NOT SHOWN OR IMPLIED ARE INTENDED TO BE THOSE CONSISTENT WITH THE PROPER FUNCTIONING OF THE PART, INCLUDING ITS APPEARANCE, AND ACCEPTED MANUFACTURING PRACTICES.
4. THE ALUMINUM POST SHAFTS SHALL BE MADE FROM A SINGLE CHANNEL-SHAPE EXTRUSION AND WELDED TO A PLATE SHAPE. THE POST BASE AND SHAFT SHALL THEN BE WELDED TOGETHER.
5. WELDING SHALL CONFORM TO THE REQUIREMENTS OF CSA S244 (LATEST EDITION), WELDED ALUMINUM DESIGN AND WORKMANSHIP AND W47.2-11 (R2015), ALUMINUM WELDING QUALIFICATION CODES. ALUMINUM FILLER ALLOY SHALL BE ONE OF THE FOLLOWING: ER4043, ER5183, ER5356, ER5554, ER5556 AND ER5654.
6. THE CONTRACTOR SHALL SUBMIT COMPLETE SHOP DRAWINGS CONSISTING OF THREE PRINTS AND ONE REPRODUCIBLE SEPIA TO THE CONTRACT ADMINISTRATOR FOR APPROVAL PRIOR TO FABRICATION OF ALUMINUM TRAFFIC BARRIER COMPONENTS.
7. ANIT-SEIZE COATING TO BE APPLIED TO ALL THREADED COMPONENTS WHEN BEING ASSEMBLED [I.E. LPS-3-MANUFACTURED BY HOLT-LLOYD (CANADA) LTD. MARKHAM, ONTARIO, L3R-2Z3].

BACKFILL MATERIAL

1. BACKFILL SHALL BE SUPPLIED, PLACED, AND COMPACTED IN AN UNFROZEN CONDITION.
2. BACKFILL AROUND CAST-IN-PLACE BOX CULVERT SHALL BE:
   a. FLOWABLE CEMENT STABILIZED-FILL PER CW 2030 AND TABLE CW 2160.1 OF CW 2160, WITH REQUIREMENTS AS MODIFIED IN THE SPECIFICATIONS.
   b. PLACED EVENLY ON BOTH SIDES OF CULVERT AS WORK PROGRESSES.
3. BACKFILL BELOW CULVERT INFILL SLAB SHALL BE:
   a. TYPE 2 MODIFIED GRANULAR BACKFILL PER CW 2030, WITH REQUIREMENTS AS MODIFIED IN THE SPECIFICATIONS.
   b. COMPACTED TO MAXIMUM 92% SPMDD USING LIGHT HAND-OPERATED VIBRATING PLATE COMPACTOR.
4. DRAINAGE BACKFILL ON OUTSIDE WALLS OF CULVERT AND INTERIOR FACE OF RETAINING WALL SHALL BE:
   a. TYPE 3 MODIFIED GRANULAR BACKFILL FOR DRAINAGE PER CW 2030, WITH REQUIREMENTS AS MODIFIED IN THE SPECIFICATIONS.
5. CULVERT GRANULAR INFILL SHALL BE:
   a. 300 NOMINAL DIAMETER RANDOM STONE.
   b. SPARSELY PLACED AS PER THE SPECIFICATIONS.

RIP RAP

1. CLASS 350 RIP RAP SHALL BE AS DESCRIBED IN THE SPECIFICATIONS.
2. INSTALL ON NON-WOVEN GEOTEXTILE KEYED MINIMUM 450 mm VERTICALLY AS SHOWN.

GEOTEXTILE

1. GEOTEXTILE FOR RIP RAP SHALL BE NON-WOVEN GEOTEXTILE IN ACCORDANCE WITH CW 3120 AND CW 3130.

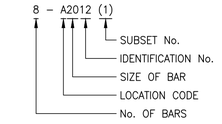
EROSION CONTROL BLANKET

1. EROSION CONTROL BLANKET SHALL BE MACHINE PRODUCED 100% COCONUT FIBRE MATRIX MEETING THE REQUIREMENTS OF THE SPECIFICATIONS.

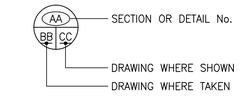
ABBREVIATIONS

@	AT
ABUT.	ABUTMENT
ALT.	ALTERNATING
APPROX.	APPROXIMATELY
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
B.C.	BEGIN CURVE
BLL	BOTTOM LOWER LAYER
BLVD.	BOULEVARD
B.O.	BOTTOM OF
BRG.	BEARING
B.S.	BOTH SIDES
BTM.	BOTTOM
BUL	BOTTOM UPPER LAYER
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
CB	CATCH BASIN
C/C	CENTER TO CENTER
℄	CENTER LINE
CONC.	CONCRETE
CONT.	CONTINUOUS
CMP	CORRUGATED METAL PIPE
CS	COMBINED SEWER
CSA	CANADIAN STANDARDS ASSOCIATION
C/W	COMPLETE WITH
DIA.	DIAMETER
ø	DIAMETER
D.L.	DEAD LOAD
DWL.	DOWEL
EB	EASTBOUND
E.C.	END CURVE
E.F.	EACH FACE
ELEV.	ELEVATION
EL.	ELEVATION
EVCE	END VERTICAL CURVE ELEVATION
EVCS	END VERTICAL CURVE STATION
EXP.	EXPANSION
EXIST.	EXISTING
EXT.	EXTERIOR
F.F.	FAR FACE
FM	FEEDERMAIN
FTG.	FOOTING
GALV.	GALVANIZED
G.B.M.	GEODETIC BENCH MARK
HORIZ.	HORIZONTAL
H.W.L.	HEAD WATER LEVEL
I.F.	INSIDE FACE
INT.	INTERIOR
INV.	INVERT
K	K VALUE
LDS	LAND DRAINAGE SYSTEM
LVC	LENGTH OF VERTICAL CURVE
MAX.	MAXIMUM
MIN.	MINIMUM
MK.	MARK
N.F.	NEAR FACE
NB	NORTHBOUND
No.	NUMBER
N.S.W.L.	NORMAL SUMMER WATER LEVEL
N.T.S.	NOT TO SCALE
PCS.	PIECES
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
O.F.	OUTSIDE FACE
O/H	OVERHEAD
O/O	OUT TO OUT
OPP.	OPPOSITE
ℙ	PLATE
PNT.	POINT
PVI	POINT OF VERTICAL INTERSECTION
REINF.	REINFORCING
R.C.	REINFORCED CONCRETE
REQ'D	REQUIRED
R.O.W.	RIGHT OF WAY
SB	SOUTHBOUND
SD	STANDARD DRAWING (CITY OF WINNIPEG STANDARD SPECIFICATION)
SHLD.	SHOULDER
SL	STREET LIGHT
SP.	SPACES
SPDD	STANDARD PROCTOR DRY DENSITY
S.S.	STAINLESS STEEL
STA.	STATION
TC	TANGENT TO CURVE
TLL	TOP LOWER LAYER
THK.	THICK
T.O.	TOP OF
TUL	TOP UPPER LAYER
TYP.	TYPICAL
VERT.	VERTICAL
U/G	UNDERGROUND
U.N.O.	UNLESS NOTED OTHERWISE
U/S	UNDERSIDE
WB	WESTBOUND
W.O.	WORKING POINT
WM	WATER MAIN
W.W.S.	WASTE WATER SEWER

REINFORCING STEEL CODE LEGEND



SECTION AND DETAIL SYMBOLS LEGEND



METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

NOTE:
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ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
WSP Canada Group Limited
No. 6657

LOCATIONS APPROVED UNDERGROUND STRUCTURES

SIGNED BY: _____ SUPV U/G STRUCTURES
DATE _____

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 EXISTANCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING

G.B.M. = TOP NUT OF FIRST HYDRANT SOUTH OF INTERSECTION BETWEEN NESS AVENUE AND LINWOOD STREET
ELEV. = 233.659

No.	REVISIONS	DATE	BY
0	ISSUED FOR TENDER	17.11.23	JL

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DESIGNED BY	MLW	CHECKED BY	WC
DRAWN BY	CP	APPROVED BY	JL
HOR. SCALE	N.T.S.	RELEASED FOR CONSTRUCTION	
VERTICAL	N.T.S.		
DATE	17.11.23	DATE	

ENGINEER'S SEAL
PROVINCE OF MANITOBA
M. L. WADELIUS
Member
23806
Nov 23/17
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT PROJECT No.
17M-00806-00

Winnipeg

THE CITY OF WINNIPEG
PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

TRURO CREEK CULVERT REPLACEMENT AT LINWOOD STREET

DESIGN DATA AND GENERAL NOTES

CITY DRAWING NUMBER: C321-17-02
BID OPPORTUNITY NUMBER: 1014-2017
SHEET 2 OF 19
REV 0