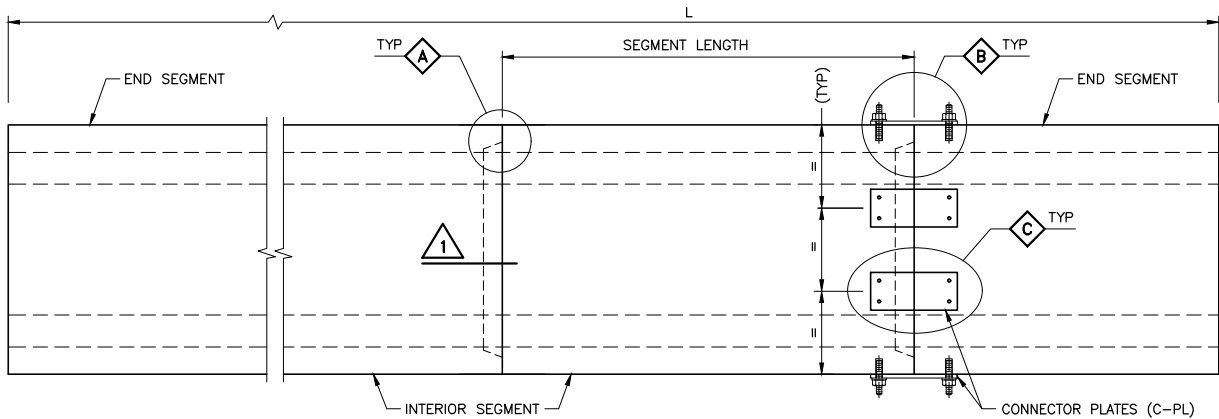
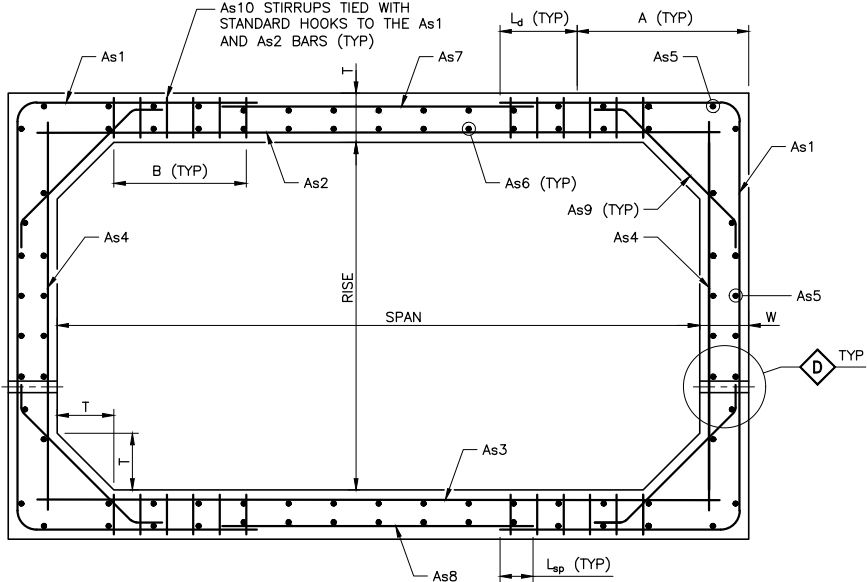
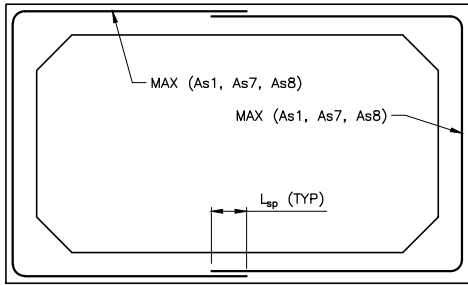




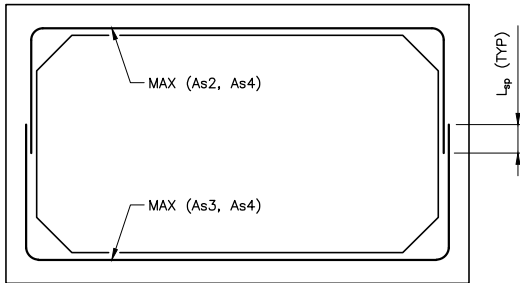
CULVERT PLAN



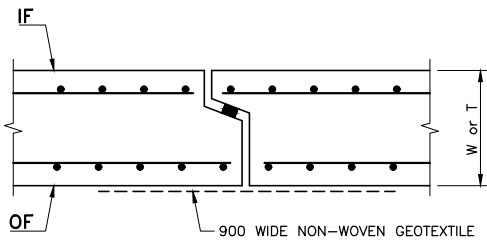
TYPICAL CULVERT SECTION



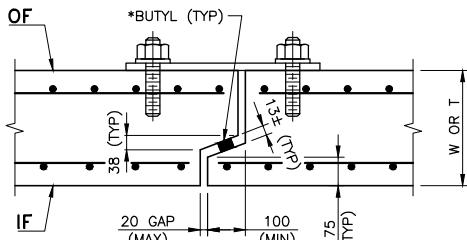
TYPE C OUTER CAGE



TYPE U INNER CAGE
REINFORCEMENT LAYOUT OPTIONS

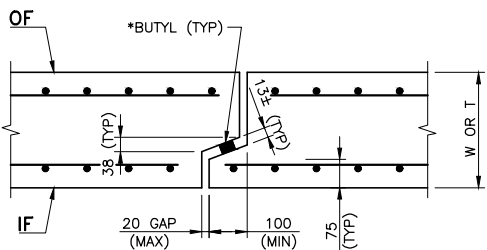


A BOTTOM SLAB AND LOWER PART OF WALLS
AT ALL JOINT LOCATIONS



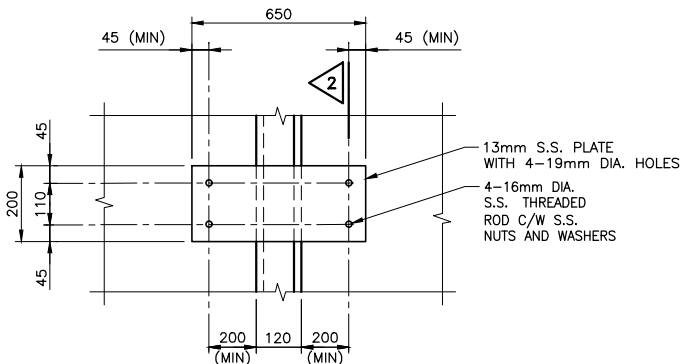
B JOINT DETAIL WITH CONNECTOR PLATE
AT TOP SLAB AND WALLS (TYP)

*BUTYL SHALL BE SIZED TO COMPLETELY SEAL THE JOINT AGAINST WATER LEAKAGE

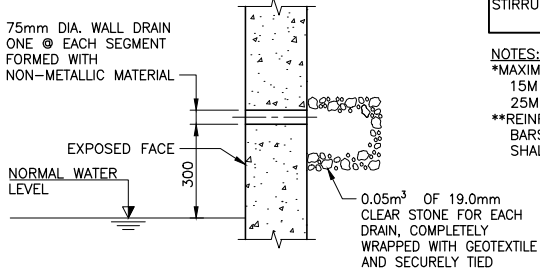


1 INTERIOR JOINT DETAIL FOR TOP SLAB
AND TOP PART OF WALLS

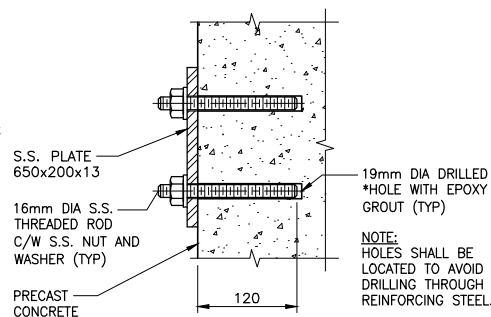
*BUTYL SHALL BE SIZED TO COMPLETELY SEAL THE JOINT AGAINST WATER LEAKAGE



C CONNECTOR PLATE



D WALL DRAIN
(TYP)



2

NOTES TO DESIGNER:

- THE DESIGNER SHALL FILL IN TABLES 1 AND 2 IN ACCORDANCE WITH THE DESIGN TABLES PUBLISHED IN PROVINCIAL ENGINEERING MEMORANDUM SCB-50-2021-01. THIS INCLUDES DIMENSIONS, NUMBERS OF CONNECTOR PLATES, AND REINFORCEMENT AMOUNTS FOR 500 MPa OR 485 MPa WWR STEEL.
- IN TABLE 1 WHEN STIRRUPS ARE NOT REQUIRED ENTER 'N/A' FOR B.
- APPURTENANCES, SUCH AS WINGWALLS, HEADWALLS, ETC., IF REQUIRED, MUST BE DETAILED ELSEWHERE BY THE DESIGNER.
- WHERE CULVERT IS BUILT IN STAGES, OVERALL LENGTH IN EACH STAGE SHALL BE SHOWN IN TABLE 1.
- NORMAL WATER LEVEL, USED TO LOCATE WALL DRAIN, SHALL BE ADDED TO THIS DRAWING IF IT DOES NOT APPEAR ON GA.
- DESIGNER SHALL DETERMINE NUMBER OF CONNECTOR PLATES (C-PL) REQUIRED TO MAINTAIN THE INTEGRITY OF THE CULVERT UNITS. PROVIDE MINIMUM TWO C-PL ON TOP SLAB AND TWO C-PL ON EACH SIDE WALLS AT THE JOINT BETWEEN LAST INTERIOR SEGMENT AND END SEGMENT. ENTER REQUIRED NUMBER OF C-PL IN TABLE 1.
- THE 'NOTES TO DESIGNER' SHALL BE DELETED FROM THIS DRAWING PRIOR TO ISSUING OF THE CONTRACT.

TABLE 1

TABLE OF DIMENSIONS (mm)	
CULVERT LENGTH, L	
SPAN	
RISE	
SLAB THICKNESS, T	
WALL THICKNESS, W	
INFLECTION POINT, A	
STIRRUP LENGTH OF NEED, B	
NO OF JOINTS FROM EACH END REQUIRING C-PL	
NO OF C-PL AT TOP SLAB PER JOINT	
NO OF C-PL AT SIDE WALLS PER JOINT	

TABLE 2

TABLE OF REINFORCEMENT				
LOC	MARK	MAX SIZE	'DEFAULT' LAYOUT	
			AREA OF STEEL (mm²/m)	DETAILS**
OUTER CAGE	As1	SEE*		
	As7	15M	600 FOR T=300 700 FOR T=350 800 FOR T=400 900 FOR T=450	STRAIGHT
	As8	15M		STRAIGHT
INNER CAGE	As2	SEE*		STRAIGHT
	As3			STRAIGHT
	As4	15M	600 FOR W=300 700 FOR W=350	STRAIGHT
TEMP. STEEL	As5	15M	500	STRAIGHT
	As6	15M	500	STRAIGHT
HAUNCH	As9	15M	660	15M @ 300mm 45° 180° OR 45° 180°
STIRRUP	As10		SEE GENERAL NOTES	

NOTES:

- *MAXIMUM REBAR SIZES FOR As1, As2 AND As3 SHALL NOT EXCEED 15M FOR As < 2500mm², 20M FOR As 2501 TO 6000mm² AND 25M FOR As > 6000mm².
- **REINFORCING BAR SPACING SHALL NOT EXCEED 300mm FOR 10M BARS AND LARGER, FOR BARS SMALLER THAN 10M MAX SPACING SHALL BE 250mm.

GENERAL NOTES:

- SPECIFIED MINIMUM 28-DAY COMPRESSIVE STRENGTH, 45 MPa.
- CLEAR COVER TO REINFORCING STEEL SHALL BE 50±10mm UNLESS OTHERWISE NOTED.
- REINFORCING STEEL SHALL BE 500W.
- WWR REINFORCEMENT SHALL BE IN ACCORDANCE WITH ASTM A1064 AND HAVE A MINIMUM YIELD STRENGTH OF 485 MPa, UNLESS OTHERWISE SPECIFIED.
- WHERE STIRRUPS ARE INDICATED AS BEING REQUIRED OVER THE LENGTH B (FROM TABLE 1), THE MAXIMUM SPACING IN THE SPAN DIRECTION SHALL NOT EXCEED 0.5 "T" (WHERE "T" IS FROM TABLE 1), AND THE SPACING IN THE LONGITUDINAL DIRECTION SHALL NOT EXCEED "T". THE AREA OF STIRRUP REINFORCEMENT OVER THE LENGTH OF B AND ALONG THE ENTIRE SEGMENT LENGTH SHALL NOT BE LESS THAN 830mm²/m² FOR 485 MPa STIRRUPS, AND NOT LESS THAN 800mm²/m² FOR 500 MPa STIRRUPS. STIRRUPS SIZES SHALL BE D5 TO D8 DEFORMED WIRES PER ASTM A1064 OR BARS OF EQUIVALENT DIAMETERS.
- BAR DEVELOPMENT L_d SHALL NOT BE LESS THAN:

BAR DIAMETER	(L _d)
15M	500mm
20M	600mm
25M	900mm

- ALL SPLICES SHALL BE CLASS B. THE SPLICE LENGTH SHALL BE, L_{sp} = 1.3 x L_d
- ALTERNATIVE LAYOUTS OF REINFORCEMENT ARE ACCEPTABLE. CONTRACTOR TO ENSURE THAT THE AREA OF STEEL PROVIDED SHALL BE CHOSEN FROM THE MAXIMUM AREAS OF STEEL SPECIFIED ON THE "REINFORCEMENT LAYOUT OPTIONS".
- STAINLESS STEEL PLATE SHALL BE ASTM A240/240M TYPE 304. THREADED STAINLESS STEEL ROD SHALL BE ASTM F593, TYPE 316 AND STAINLESS STEEL NUTS SHALL BE AS PER ASTM F594.
- CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF LIFTING ANCHORS.
- LIFTING AND HANDLING LOADS ARE NOT CONSIDERED IN THE DESIGN. CONTRACTOR TO ENSURE THAT CULVERT UNITS ARE NOT ADVERSELY LOADED DURING SHIPPING AND INSTALLATION DUE TO LIFTING AND HANDLING.
- FOR HEADWALL, WINGWALL, APRON, OR CUT-OFF WALL DETAILS REFER TO OTHER DRAWINGS OF THE CONTRACT.
- NORMAL WATER LEVEL FOR DRAIN SETTING CAN BE FOUND ELSEWHERE IN CONTRACT.
- MAXIMUM SEGMENT LENGTH=3.0m. MINIMUM INTERIOR SEGMENT LENGTH=1.5m, MINIMUM END SEGMENT LENGTH=1.8m, BUT NOT < 90% OF INTERIOR SEGMENT.
- CULVERT SHALL RECEIVE WATERPROOFING AT TOP SLAB AND AT ALL JOINTS ACCORDING TO THE CONTRACT DOCUMENTS.
- LEGEND: C-PL - CONNECTOR PLATE
SS - STAINLESS STEEL
IF - INSIDE FACE
OF - OUTSIDE FACE
LONGITUDINAL DIRECTION - DIRECTION ALONG THE LENGTH OF THE CULVERT

FABRICATION NOTES:

IN FABRICATION PLANT WELDING OF REINFORCING BARS SHOWN ON TYPICAL CULVERT SECTION IS PERMITTED AS PER THE FOLLOWING REQUIREMENTS:

- WELDING OF INTERNAL BARS AS2, AS3, AND AS4 TO EACH OTHER AT THEIR INTERSECTIONS IS PERMITTED.
- WELDING OF REINFORCING BARS AS5 TO AS6 IS PERMITTED WHEN ACCOMPLISHED USING ADDITIONAL SPACER BARS.
- WELDING DETAILS SHALL BE SUBMITTED ACCORDING TO THE SPECIFICATIONS.

CONSTRUCTION NOTES:

- BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH SIDES OF CULVERT KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
- SUPPORTS FOR REINFORCING STEEL SHALL BE AS PER OPSD 3329.101 AND OPSD 3329.100 ON FORMED SURFACES. ON NON-FORMED SURFACES, CONCRETE BLOCKS (MIN. 20MPa) SHALL BE USED.

STANDARD DRAWING MAY 2026		SS114-4
PRECAST RIGID FRAME BOX CULVERT		

REFER TO THE STRUCTURAL MANUAL FOR PROFESSIONAL ENGINEER STAMPING REQUIREMENTS.	
--	--

APPLICABLE STANDARD DRAWINGS:

MTOD 3941.200 FIGURES IN CONCRETE SITE NUMBER
AND DATE LAYOUT
OPSD 803.010 BACKFILL AND COVER FOR CONCRETE
CULVERTS

REVISIONS					
DATE	BY	DESCRIPTION			
DESIGN	-CHK	-CODE	CSA S6-19	LOAD CL-625-ONT	DATE
DRAWN	-CHK	-SITE	-		DWG