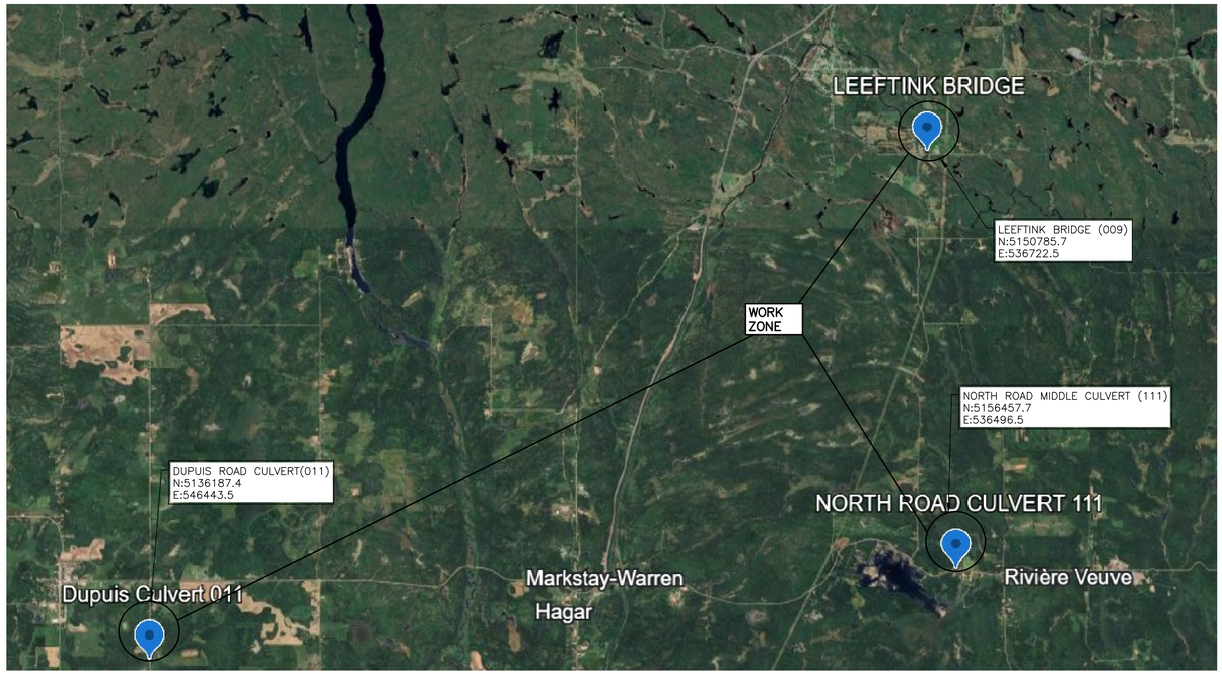


MUNICIPALITY OF MARKSTAY–WARREN

KEYPLAN

N.T.S.

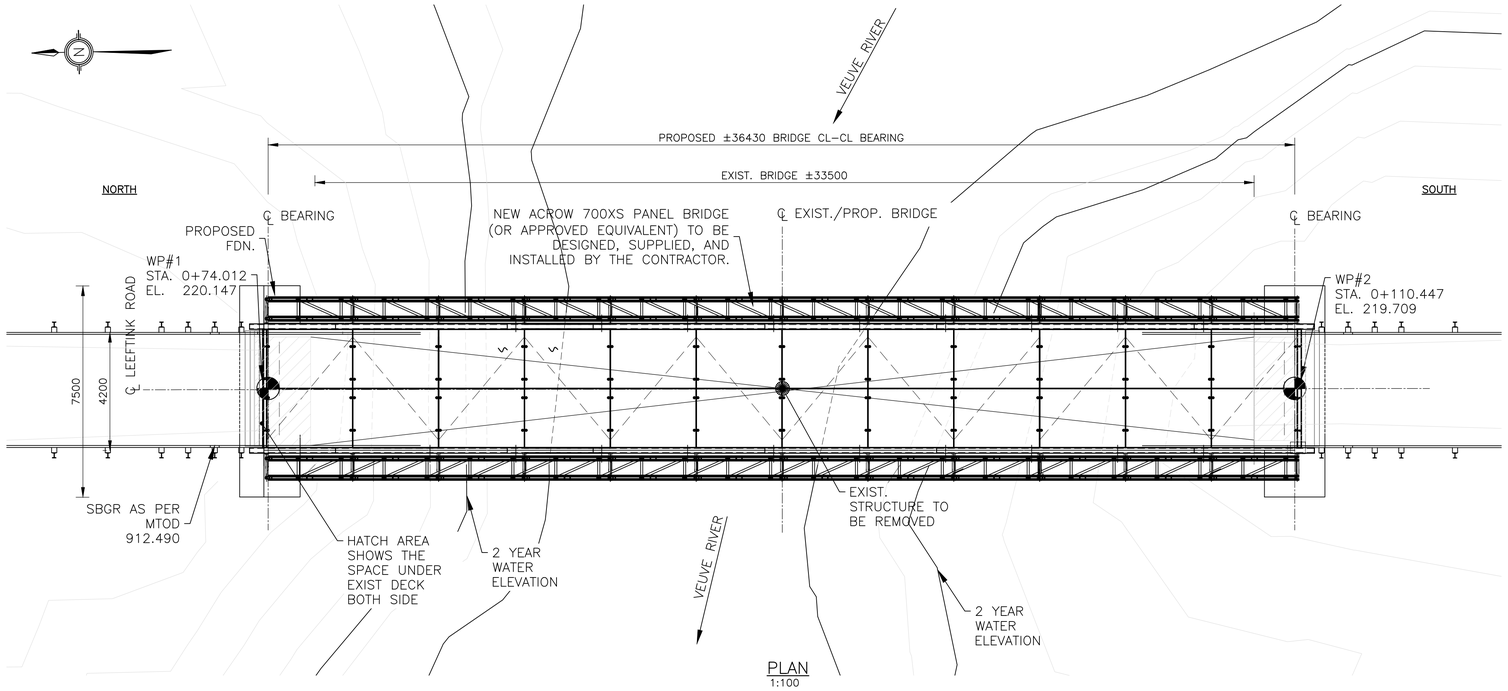
MUNICIPALITY OF | MUNICIPALITÉ DE
MARKSTAY
WARREN

MUNICIPALITY OF MARKSTAY-WARREN
LEEFTINK RD. BRIDGE REPLACEMENT
DUPUIS RD. CULVERT REPLACEMENT
NORTH RD. MIDDLE SECTION CULVERT REPLACEMENT

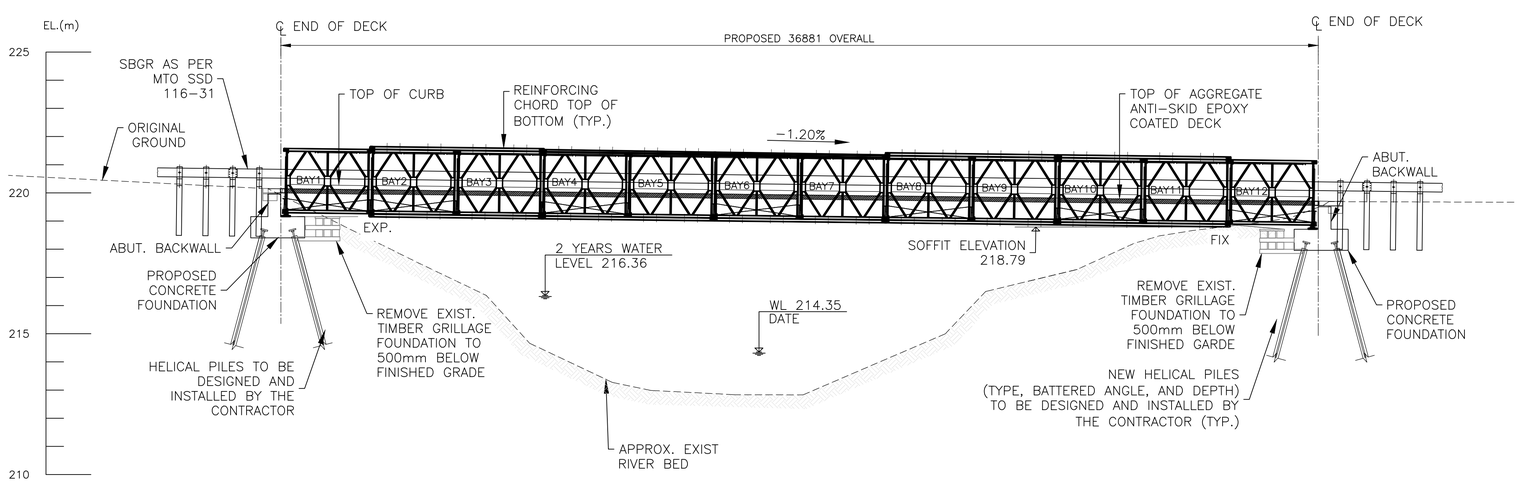
INDEX TO PLANS

CONTRACT No. TMW-2026-08

R.V. ANDERSON ASSOCIATES LIMITED
Innovative solutions for complex challenges



PLAN
1:100



ELEVATION
1:100

GENERAL NOTES:

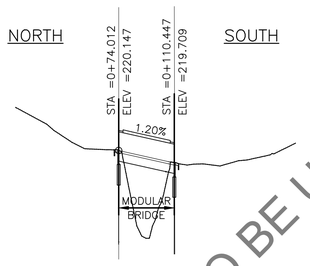
1. THE REPLACEMENT BRIDGE SHALL BE A MODULAR BRIDGE WITH SPECIFIED DIMENSIONS, DESIGNED AND MANUFACTURED BY CONTRACTOR. ACROW BRIDGE AS SHOWN ON THIS DRAWING IS FOR ILLUSTRATION PURPOSES ONLY.
2. DESIGN OF MODULAR BRIDGE IN ACCORDANCE WITH CANADIAN HIGHWAY BRIDGE DESIGN CODE S6–25 (CHBDC).
3. BRIDGE DESIGN LIVE LOAD: CL–625–ONT (TRUCK)
4. THE CONTRACTOR SHALL CONFIRM ALL DIMENSIONS OF MODULAR BRIDGE COMPONENTS BEFORE ESTABLISHING ELEVATION OF BEARING SEATS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSPECTION OF ALL BRIDGE COMPONENTS PRIOR TO ASSEMBLING THE MODULAR BRIDGE.
6. CLASS OF CONCRETE
   (CLASS OF CONCRETE) 35 MPa
   CLASS OF EXPOSURE C–1
7. CONTRACTOR IS ADVISED THAT THE CURRENT GRAVEL ROAD PROFILE MAY VARY FROM THE PROFILE SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL UNDERTAKE A TOPOGRAPHIC SURVEY PRIOR TO CONSTRUCTION, AND INSTALL THE MODULAR BRIDGE AND GRAVEL ROAD RESTORATION TO MATCH PRE–CONSTRUCTION ROAD PROFILE.
8. ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ELEVATIONS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.

REINFORCING NOTES:

1. CLEAR COVER TO REINFORCEMENT STEEL TO BE 70±20mm (UNLESS OTHERWISE NOTED)
2. REINFORCING STEEL SHALL BE GRADE 500W UNLESS OTHERWISE SPECIFIED.
3. TENSION LAP LENGTH NOT INDICATED ON CONTRACT SHALL BE CLASS B.
4. BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETER, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARDS DRAWINGS SS12–1, UNLESS INDICATED OTHERWISE.

HELICAL PILE NOTES:

1. FOR PRELIMINARY PLANNING AND CONCEPT DESIGN PURPOSES, A SS<XXX> HELICAL PILE ADVANCED TO THE VERY DENSE SILTY SAND OR DENSE SAND WITH N–VALUE GREATER THAN 50 BLOWS PER 0.3m MAY BE DESIGNED USING FACTORED GEOTECHNICAL RESISTANCES OF <XX> KN AT ULS AND OF <XX> KN AT SLS.
2. FIELD LOAD TESTING OF PILES SHALL BE PROVIDED TO CONFIRM THE DESIGN BEARING CAPACITY AS PER THE REQUIREMENTS OF SPECIFICATIONS PROVIDED IN THE CONTRACT DOCUMENT.
3. FOR GEOTECHNICAL INFORMATION, REFER TO REPORT BY EXP DATED JUNE 1, 2026



PROFILE OF PROPOSED LEEFTINK ROAD
N.T.S.

APPLICABLE STANDARD DRAWINGS:

OPSD	3101.150	WALLS ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENT
MTOD	912.490	GUIDE RAIL SYSTEM, STEEL BEAM

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, SITE DETAILS AND ELEVATIONS RELEVANT TO THE WORKS SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF THE WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR AND THE PROPOSED ADJUSTMENT OD THE WORK SHALL BE SUBMITTED FOR APPROVAL.
2. THE CONTRACTOR SHALL ESTABLISH THE BEARING SEAT ELEVATION BY DEDUCTING THE ACTUAL DEPTH OF THE MODULAR BRIDGE SUPPLIED FROM SPECIFIED WORK POINT ON TOP OF PAVEMENT ELEVATIONS.

SEQUENCE OF WORK:

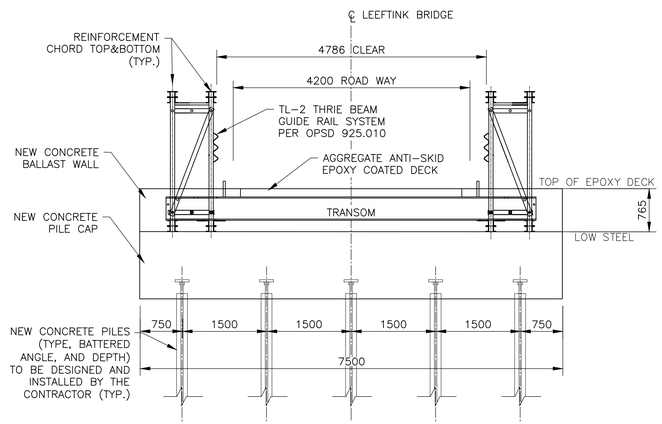
1. XXXX

ENVIRONMENT NOTES:

1. CONTRACTOR SHALL BE REQUIRED TO PROVIDE EROSION AND SEDIMENT CONTROL (ESC) PLAN. ESC MEASURES SHALL BE IMPLEMENTED PRIOR TO AND MAINTAINED DURING CONSTRUCTION TO PREVENT ENTRY OF SEDIMENT INTO THE WATER. REFER TO SPECIAL PROVISIONS NOTED ELSEWHERE IN THE CONTRACT.
2. NO IN–WATER WORK(I.E., BELOW THE HIGH WATER MARK) IS PERMITTED TO REPLACE THE LEEFTINK ROAD BRIDGE.
3. ALL ACTIVITIES WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIES, RUBBLE, CONCRETE, OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICLE REFUELING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30 METRES FROM ANY AQUATIC RESOURCES TO AVOID POTENTIAL IMPACTS.
4. SHOULD ANY DELETERIOUS SUBSTANCES ENTER THE WATERCOURSE, INCLUDING SEDIMENT, THIS MUST BE REPORTED TO THE MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS (MECP) SPILLS ACTION CENTRE (1–800–268–6060) AND DFO FISH AND FISH HABITAT PROTECTION PROGRAM (1–855–852–8320 OR FISHERIESPROTECTION@DFO–MPO.GC.CA).
5. ALL DISTURBED AREAS SHALL BE STABILIZED AND RESTORED, WITH THE SEED MIXES NOTED ELSEWHERE IN THE CONTRACT AND DRAWINGS, IMMEDIATELY UPON COMPLETION OF GRADING WORK.

WORKING POINTS				
	STATION AT C/L ROAD	COORDINATES		ELEVATION
W.P. # 1	0+74.012	N 5150800.427	E 536718.162	220.147
W.P. # 2	0+110.447	N 5150763.985	E 536718.875	219.709

	WATER LEVEL (m)					
	2 YEAR	5 YEAR	10 YEAR	25 YEAR	50 YEAR	100 YEAR
FLOW (m^3/s)	28.6	34.3	46.4	55.3	62	67.6
ELEV. (m)	216.36	216.63	217.02	217.28	217.44	217.58



CROSS–SECTION
1:50

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

TO BE UPDATED

REVISIONS		
DATE	DETAILS	BY
2026–06–26	ISSUED FOR TENDER	S.M.C.

CAUTION

- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED
- LOCATION & SIZE OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

NOT ISSUED FOR CONSTRUCTION

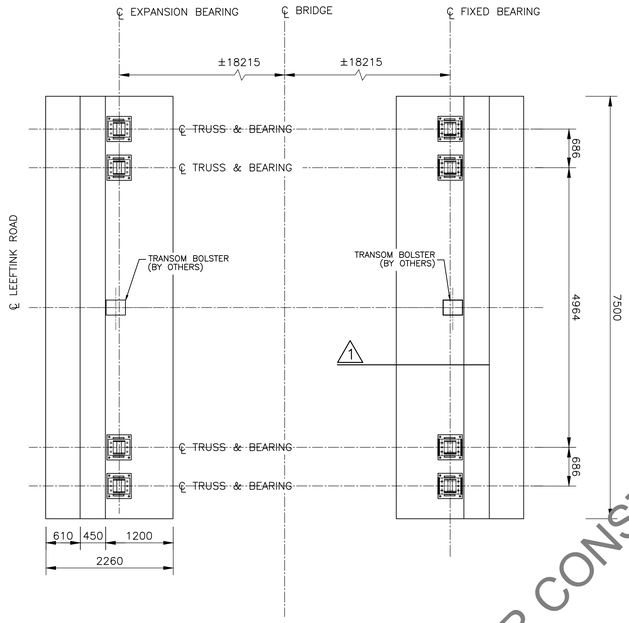
DATE:	2026–06–26
DRAWN:	E.C.
DESIGNED:	T.Z.
CHECKED:	R.M.
ENGINEER:	S.M.C.
APPROVED:	D.J.O.

MUNICIPALITY OF | MUNICIPALITÉ DE
MARKSTAY WARREN

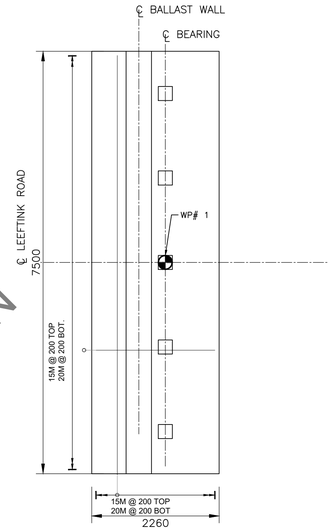
R.V. ANDERSON ASSOCIATES LIMITED
Innovative solutions for complex challenges

LEEFTINK BRIDGE REPLACEMENT
GENERAL ARRANGEMENT

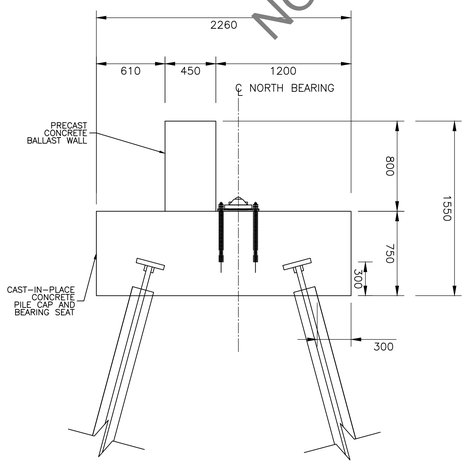
SCALE:	AS SHOWN
CONTRACT NO.:	TMW–2026–08
CAD/FILE NUMBER:	237107
PAGE NO.:	2



PLAN
1:50
(MODULAR STEEL BRIDGE STRUCTURE NOT SHOWN FOR CLARIFY)

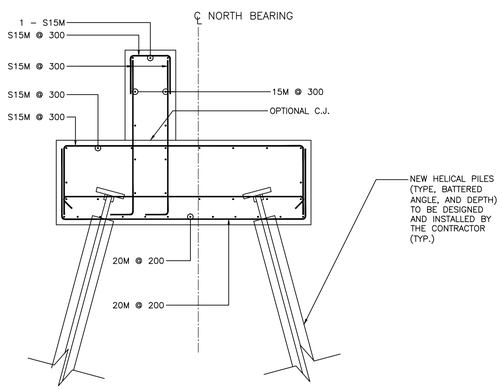


TYP. FOOTING REINFORCING
1:50
(MODULAR STEEL BRIDGE STRUCTURE NOT SHOWN FOR CLARIFY)

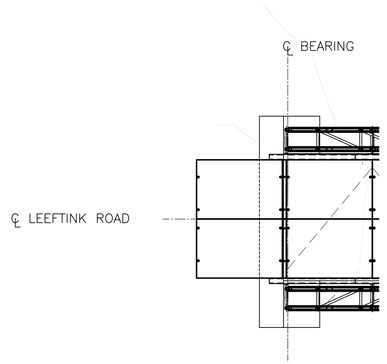


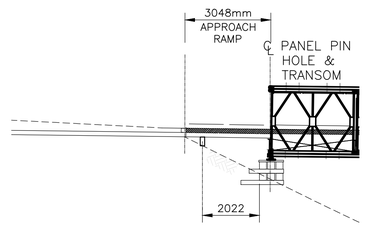
DIMENSIONS
1:25

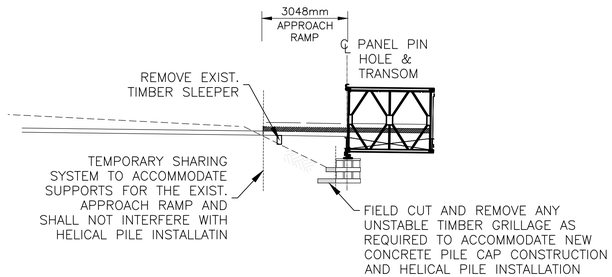
1

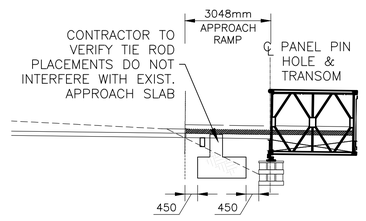


REINFORCING
1:25









ROADWAY PROTECTION AND STAGING
N.T.S.

CONSTRUCTION NOTES:

1. PRE–CAST CONCRETE BALLAST WALLS SHALL BE FABRICATED BY A CSA APPROVED PRE–CAST PLANT.
2. PROVIDE LIFTING LUGS ON PRE–CAST COMPONENTS AS REQUIRED FOR SAFE TRANSPORTATION AND HANDLING OF THE COMPONENTS.
3. TOP OF BALLAST WALL SHALL MATCH THE ADJACENT DECK ELEVATION. CONTRACTOR SHALL VERIFY THE HEIGHT OF THE BALLAST WALL WITH THE MODULAR BRIDGE SHOP DRAWINGS.
4. PRIOR TO THE PLACEMENT OF ANY STRUCTURAL FILL AND/OR FOUNDATIONS, THE CONTRACTOR SHALL NOTIFY THE CONTRACT ADMINISTRATOR TO COORDINATE THE REVIEW OF EXCAVATION AND SUBGRADE BY GEOTECHNICAL ENGINEER.

HELICAL PILE NOTES:

1. FOR PRELIMINARY PLANNING AND CONCEPT DESIGN PURPOSES, A SS<XXX> HELICAL PILE ADVANCED TO THE VERY DENSE SILTY SAND OR DENSE SAND WITH N–VALUE GREATER THAN 50 BLOWS PER 0.3m MAY BE DESIGNED USING FACTORED GEOTECHNICAL RESISTANCES OF <XX> KN AT ULS AND OF <XX> KN AT SLS.
2. FIELD LOAD TESTING OF PILES SHALL BE PROVIDED TO CONFIRM THE DESIGN BEARING CAPACITY AS PER THE REQUIREMENTS OF SPECIFICATIONS PROVIDED IN THE CONTRACT DOCUMENT.
3. FOR GEOTECHNICAL INFORMATION, REFER TO REPORT BY EXP DATED JUNE 1, 2026

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS		
DATE	DETAILS	BY
2026–06–26	ISSUED FOR TENDER	S.M.C.

CAUTION

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NOT ISSUED FOR CONSTRUCTION

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DRAWN:	E.C.
DESIGNED:	T.Z.
CHECKED:	R.M.
ENGINEER:	S.M.C.
APPROVED:	D.J.O.

MUNICIPALITY OF | MUNICIPALITÉ DE MARKSTAY WARREN

R.V. ANDERSON ASSOCIATES LIMITED
Innovative solutions for complex challenges

LEEFTINK BRIDGE REPLACEMENT

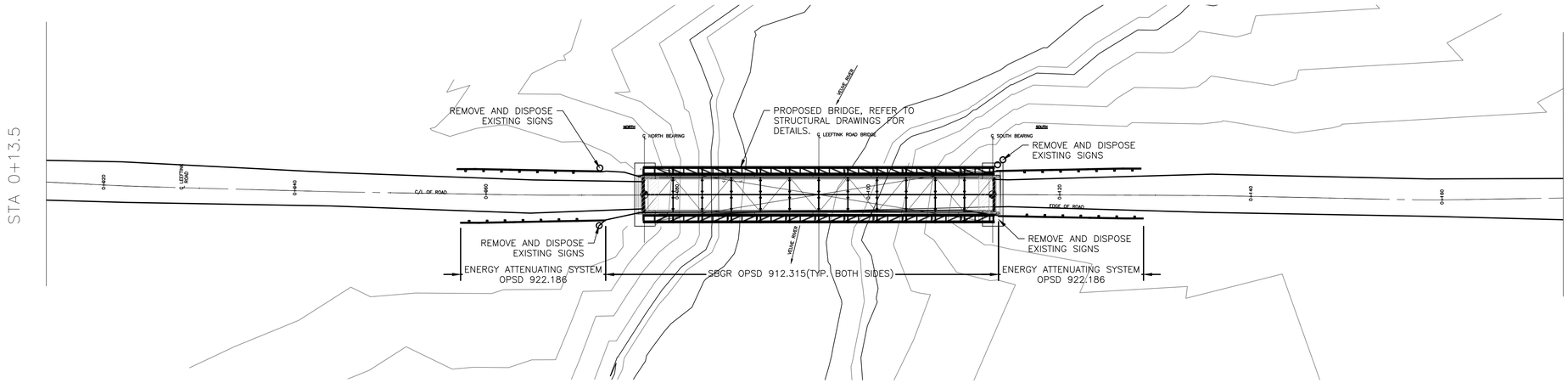
FND. & FTG. LAYOUT REINFORCEMENT

SCALE:	AS SHOWN
CONTRACT NO.:	TMW–2026–08
CAD/FILE NUMBER:	237107
PAGE NO.:	3

MUNICIPALITY OF MARKSTAY–WARREN

NOTES:
1. All dimensions are in metres unless otherwise noted.
2. # denotes buildings plotted from O.L.S. Plan.
   ∆ denotes basement floor elevation, with house number.
   ∆ denotes basement floor elevation, with house number.
3. All sanitary and storm sewer connections are 100mm PVC SDR28 unless otherwise noted.
4. All sanitary and storm sewer elevations are inverts unless otherwise noted.

LEEFTINK ROAD

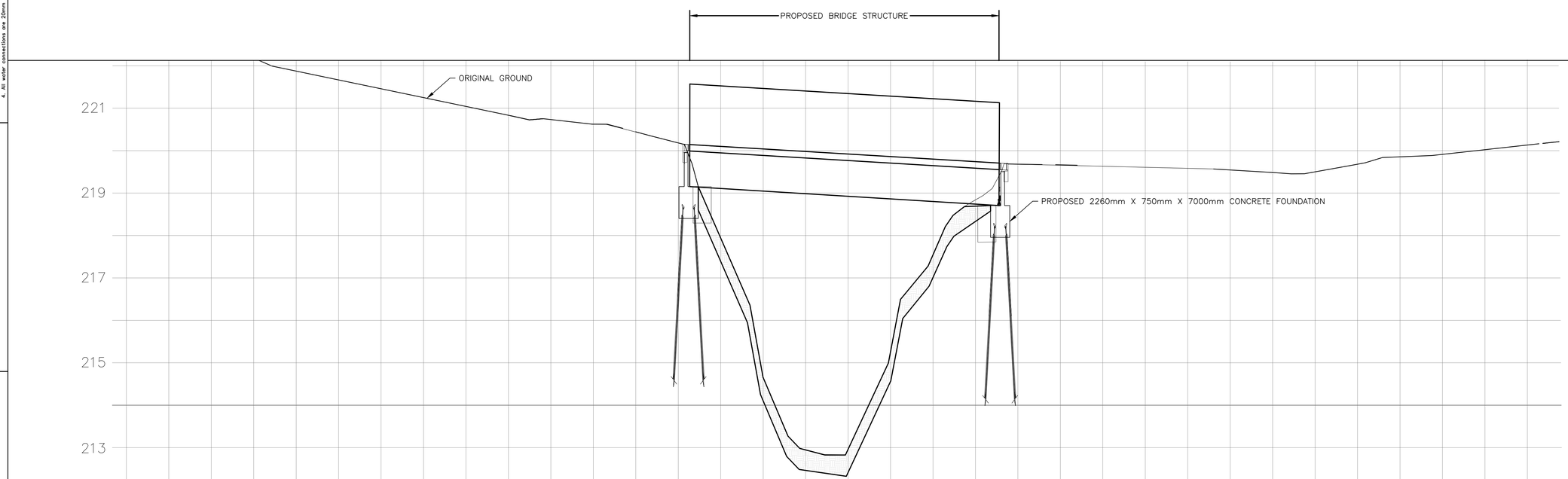


PLAN
1:250

HOT MIX ASPHALT AND GUIDE RAIL BARRIER SYSTEM LEGEND

A. STEEL BEAM TRANSITION FROM GUIDE RAIL WITH CHANNEL FROM STRUCTURE (OPSD 912.315) TO STEEL BEAM GUIDE RAIL BARRIER WITH STEEL POSTS AND POLY OFFSET BLOCK (OPSD 912.186)

B. ENERGY ATTENUATOR END TREATMENT (OPSD 922.186)



REVISIONS		
DATE	DETAILS	BY
2026–06–26	ISSUED FOR TENDER	SMC

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MARKSTAY WARREN

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LEEFTINK STREET BRIDGE
STA 0+13.5 TO STA 0+72
LEEFTINK ROAD
MUNICIPALITY OF MARKSTAY–WARREN

SCALE:	1:250 HOR. 1:50 VER.
CONTRACT NO.:	TMW–2026–08
CAD/FILE NUMBER:	237107
PAGE NO.:	4

MUNICIPALITY OF MARKSTAY-WARREN

NOTES:
1. All dimensions are in metres unless otherwise noted.
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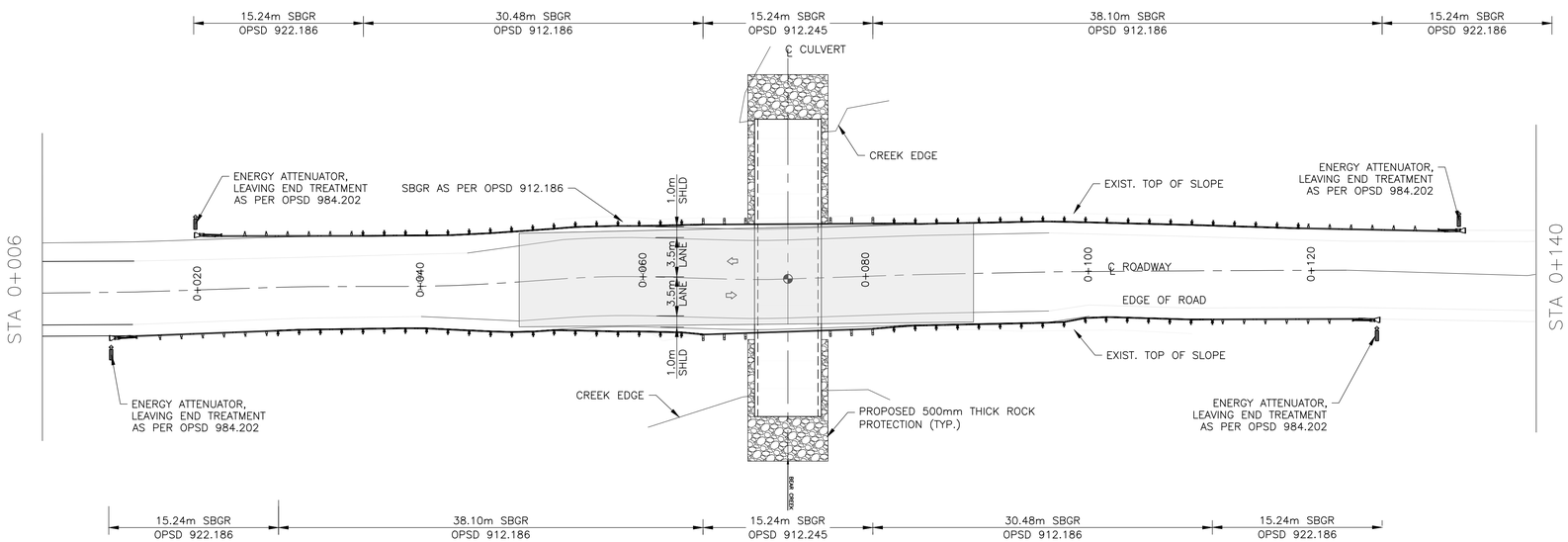
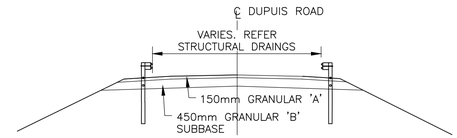
3. ▲ denotes basement floor elevation, with house number.
4. All watermains and storm sewers shall be installed with a minimum of 2.4m cover unless otherwise noted.
5. All sanitary sewer connections are 100mm PVC SDR28 unless otherwise noted.
6. All sanitary and storm sewer elevations are inverts unless otherwise noted.

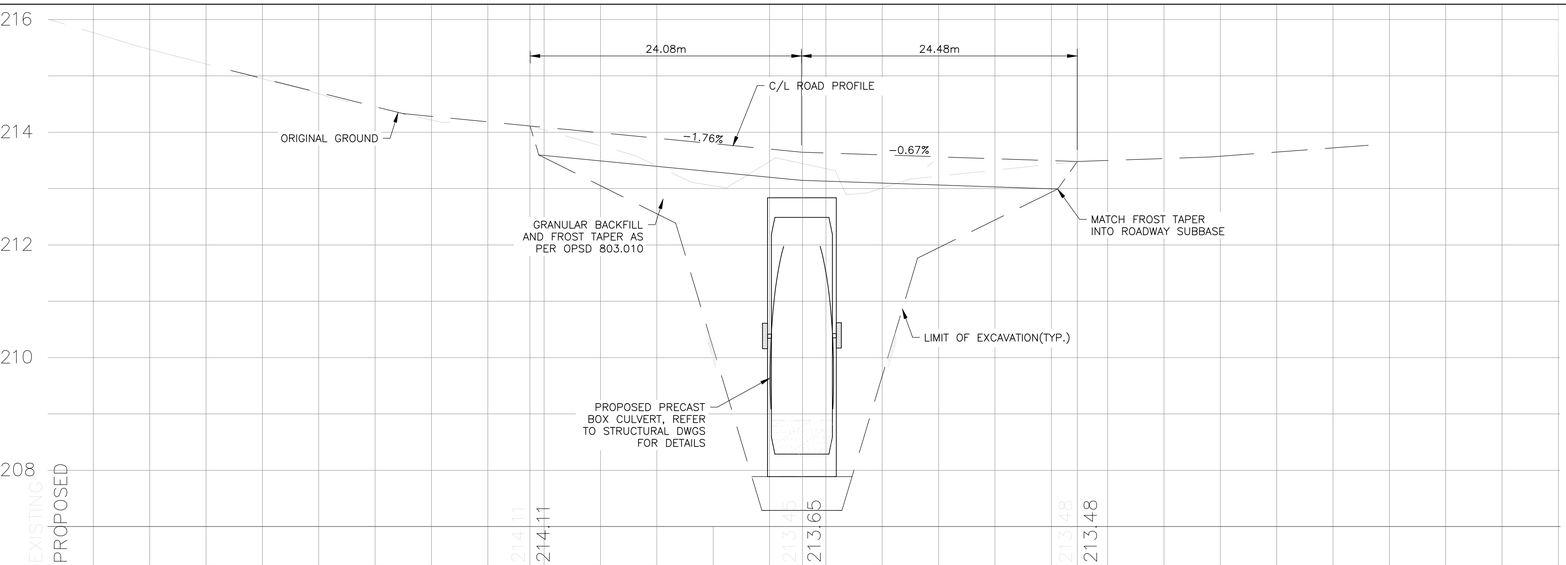
DUPUIS ROAD



PLAN
1:250



TYPICAL ROAD SECTION
N.T.S



REVISIONS		
DATE	DETAILS	BY
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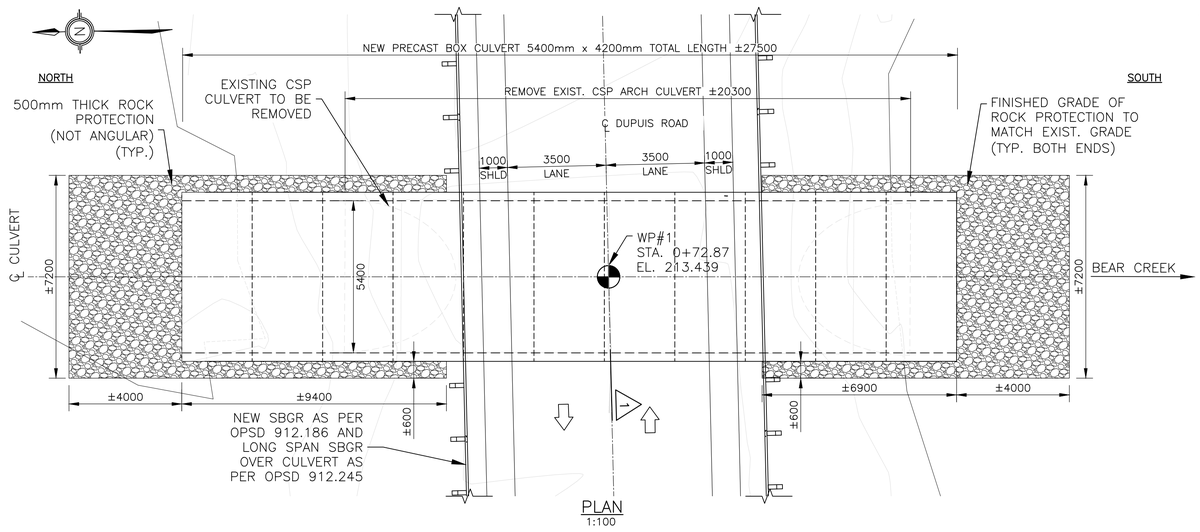
MUNICIPALITY OF | MUNICIPALITÉ DE MARKSTAY WARREN

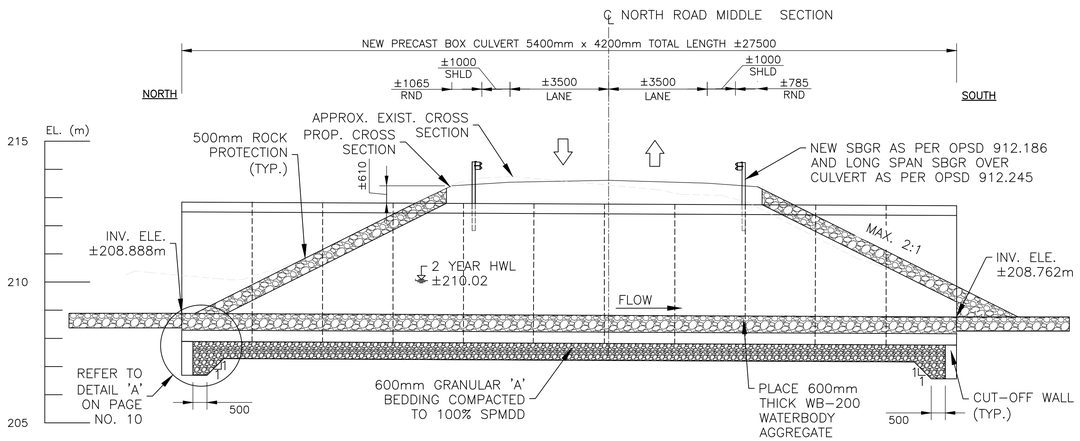
R.V. ANDERSON ASSOCIATES LIMITED
Innovative solutions for complex challenges

DUPUIS ROAD CULVERT
STA 0+006 TO STA 0+150
DUPUIS ROAD
MUNICIPALITY OF MARKSTAY-WARREN

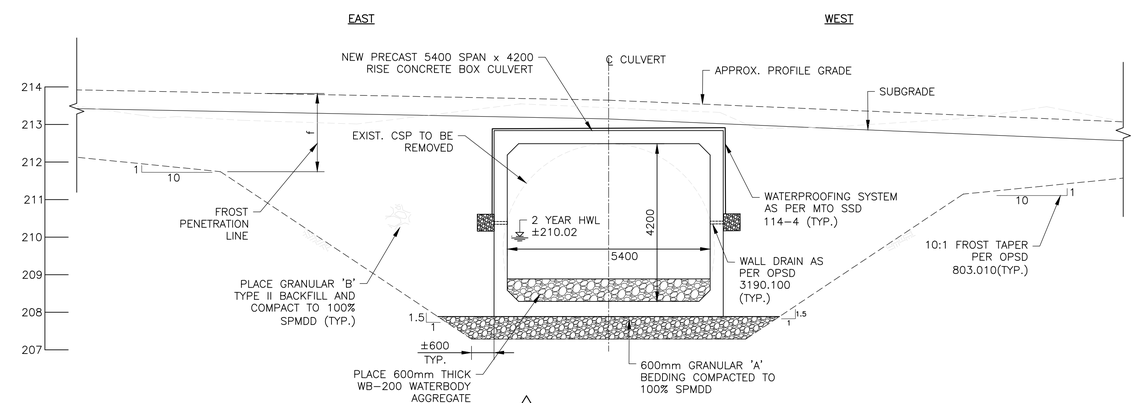
SCALE:	1:250 HOR. 1:50 VER.
CONTRACT NO.:	TMW-2026-08
CAD/FILE NUMBER:	237107
PAGE NO.:	5



PLAN
1:100

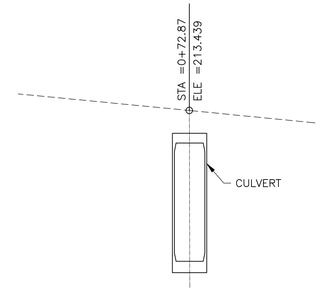


ELEVATION
1:100



1 CROSS-SECTION
1:75

NOTE: SECTION PERPENDICULAR TO C/L OF CULVERT



PROFILE OF DUPUIS ROAD
N.T.S.

	WATER LEVEL (m)					
	2 YEAR	5 YEAR	10 YEAR	25 YEAR	50 YEAR	100 YEAR
FLOW (m^3/s)	5.5	6.8	9.7	11.9	13.7	15.2
ELEV. (m)	210.02	210.18	210.51	210.73	210.9	211.04

GENERAL NOTES:

1. PRECAST CULVERT ELEMENTS SHALL BE DESIGNED BY THE FABRICATOR IN ACCORDANCE WITH CHBDC S6-25 AND AS SPECIFIED IN THE CONTRACT DOCUMENT.
2. CLASS OF CONCRETE
   PRECAST CULVERT C1-45 MPa
   CAST IN PLACE C1-35 MPa
   UNLESS OTHERWISE NOTED
3. REINFORCING STEEL SHALL BE GRADE 500, CONFORM TO CSA STANDARD G30.18M, GRADE 500W. WELDED WIRE FABRIC.(WWF) SHALL BE GARDE 500. LAP REINFORCING BARS 40 BAR DIAMETERS AT SPLICES UNLESS OTHERWISE INDICATED ON THE DRAWING.
4. CLEAR COVER TO REINFORCING STEEL
   PRE-CAST CONCRETE
   TOP SLAB 55±10
   BOTTOM 40±10
   REMAINDER 55±10
   CAST-IN-PLACE CONCRETE
   REMAINDER 70±20
   UNLESS OTHERWISE NOTED
5. CONTRACTOR IS ADVISED THAT THE CURRENT GRAVEL ROAD PROFILE MAY VARY FROM THE PROFILE SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL UNDERTAKE A TOPOGRAPHIC SURVEY PRIOR TO CONSTRUCTION, AND GRAVEL ROAD RESTORATION TO MATCH PRE-CONSTRUCTION ROAD PROFILE.
6. CHAMFER ALL EXPOSED CONCRETE EDGES 25x25 UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
7. ALL SERVICES/UTILITIES ARE TO BE ACCURATELY LOCATED PRIOR TO CONSTRUCTION AND PROTECTION PROVIDED AT ALL TIMES. ANY INTERFERENCE OF EXISTING SERVICES/UTILITIES WITH PROPOSED STRUCTURE OR CONSTRUCTION OPERATION IS TO BE PREPORTED TO THE CONTRACT ADMINISTRATION PRIOR TO CONSTRUCTION.
8. BACKFILL ON EACH SIDE OF THE CULVERT SHALL BE COMPLETED SIMULTANEOUSLY. AT NO TIME SHALL THE BACKFILL LEVELS ON EACH SIDE DIFFER BY MORE THAN 300mm.
9. CUT-OFF WALLS SHALL BE CAST AGAINST UNDISTURBED SOIL.
10. NO CONCRETE OR BEDDING SHALL BE PLACED UNTIL THE EXCAVATION HAS BEEN APPROVED BY THE CONTRACT ADMINISTRATOR.
11. ALL ACTIVITIES SHALL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER COURSE.
12. REFER TO ROAD CONSTRUCTION STAGING DRAINGS TO MAINTAIN TRAFFIC AND WORK SEQUENCE DETAILS.
13. WATERPROOF TOP AND SIDES OF CULVERT (ALONG FULL LENGTH OF ENTIRE CULVERT).
14. TOP SLAB AND WALL WATERPROOF SHALL BE SELF ADHERING SHEET WATERPROOFING BELOW GRADE WATERPROOFING MEL-ROL BY W.R.MEADOWS INSTALLED IN ACCORDANCE WITH THE MANUFACTURES INSTRUCTIONS.
15. PROTECTION BOARD ABOVE WATERPROOFING REQUIRED BELOW GRANULAR FILL ON TOP OF CULVERT.

ENVIRONMENTAL NOTES:

1. IN-WATER WORK IN BEAR CREEK (WORK BELOW THE HIGHWATER MARK OF THE WATERCOURSE) IS ONLY PERMITTED BETWEEN JUNE 16 AND MARCH 31. THIS INCLUDES COFFERDAM INSTALLATION/OPERATION/REMOVAL.
2. ESC MEASURES SHALL BE IMPLEMENTED PRIOR TO AND MAINTAINED DURING THE CONSTRUCTION PHASES TO PREVENT ENTRY OF SEDIMENT INTO THE WATER.
3. ALL WORK BELOW THE HIGH WATER MARK SHALL BE COMPLETED IN ISOLATION OF THE OPEN WATERCOURSE TO ENSURE SEDIMENT GENERATED DURING CONSTRUCTION ACTIVITIES ARE CONTAINED TO THE WORKSITE. COFFERDAMS ARE TO BE CONSTRUCTED USING CLEAN MATERIALS, FREE OF PARTICULATE MATTER, TO ISOLATE THE WORKSITE, FOLLOWING THE GUIDANCE IN THE FISHERIES AND OCEANS CANADA (DFO)'S STANDARD: IN-WATER SITE ISOLATION.
4. WORK INSIDE THE ISOLATED AREA SHALL BE CONDUCTED IN THE DRY, AS PER THE NOTED DFO STANDARD. IF UNWATERING ACTIVITIES ARE REQUIRED WITHIN AN ISOLATED WORK AREA, A QUALIFIED BIOLOGIST WILL RELOCATE ANY FISH TRAPPED WITHIN THE AREA TO SUITABLE HABITAT DOWNSTREAM, UNDER A LICENCE TO COLLECT FISH FOR SCIENTIFIC PURPOSES ISSUED BY THE MINISTRY OF NATURAL RESOURCES (MNR), PRIOR TO REMOVING WATER.
5. DURING ALL UNWATERING ACTIVITIES, SCREENS WILL BE PLACED AT THE END OF ALL PUMP INTAKES, IN ACCORDANCE WITH DFO'S STANDARD: WATER INTAKE END-OF-PIPE FISH SCREENS, TO PREVENT THE POTENTIAL ENTRAINMENT OF FISH AND OTHER AQUATIC ANIMALS DURING WATER EXTRACTION.
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9. ALL DISTURBED AREAS SHALL BE STABILIZED AND RESTORED, WITH THE SEED MIXES NOTED ELSEWHERE IN THE CONTRACT AND DRAWINGS, IMMEDIATELY UPON COMPLETION OF GRADING WORK.

CONSTRUCTION SEQUENCES:

1. THE CONTRACTOR SHALL ENSURE APPLICABLE EROSION AND SEDIMENT CONTROL MEASURES ARE IN PLACE PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES AND REMAIN IN PLACE UNTIL ALL DISTURBED AREAS ARE FULLY STABILIZED SO AS TO RETAIN SEDIMENT ON-SITE AND PREVENT ITS ENTRY INTO THE WATERCOURSE.
2. INSTALL TEMPORARY FLOW PASSAGE SYSTEM AS PERMITTED BY THE CONTRACT ADMINISTRATOR PRIOR TO COMMENCEMENT OF ANY IN-STREAM WORK.
3. EXCAVATE AND CONSTRUCT CULVERT.
4. WATERPROOF CULVERT AT JOINTS.
5. REHABILITATE, RESTABILIZE AND REVEGETATE ALL DISTURBED AREAS AS PER THE ENVIRONMENTAL REQUIREMENTS.
6. REMOVE EROSION AND SEDIMENT CONTROL MEASURES.

APPLICABLE STANDARD DRAWINGS:

OPSD 206.010	GRANULAR COURSES
OPSD 803.010	BACKFILL AND COVER FOR CONCRETE CULVERTS
OPSD 912.186	GUIDE RAIL SYSTEM, STEEL BEAM TYPE M20 – ADJACENT TO 2H:1V SLOPE INSTALLATION – RAIL AT SHOULDER
OPSD 912.245	GUIDE RAIL SYSTEM, STEEL BEAM TYPE M-7.62m LONG SPAN TREATMENT INSTALLATION
OPSD 3101.150	WALLS ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENT
OPSD 3190.100	WALLS RETAINING AND ABUTMENT WALL DRAIN

GEOTECHNICAL INFORMATION:

REFER TO GEOTECHNICAL INVESTIGATION REPORT SUD-24002582-B0 PREPARED BY EXP SERVICES INC. DATED JANUARY 28, 2026. AND ADDENDUM NO.1 DATED JUNE 18, 2026.

LIST OF ABBREVIATIONS

APPROX.	– DENOTES APPROXIMATELY
C/L	– DENOTES CONTROL LINE
C.I.P.	– DENOTES CAST-IN-PLACE
CSP.	– DENOTES CORRUGATED STEEL PIPE
DIA.	– DENOTES DIAMETER
ELE.	– DENOTES ELEVATION
EXIST.	– DENOTES EXISTING
HWL.	– DENOTES HIGH WATER LEVEL
INV.	– DENOTES INVERT
MIN.	– DENOTES MINIMUM
MAX	– DENOTES MAXIMUM
N.T.S.	– DENOTES NOT TO SCALE
PROP.	– DENOTES PROPOSED
RND.	– DENOTES ROUNDING
S.B.G.R.	– DENOTES STEEL BEAM GUIDE RAIL
SHLD	– DENOTES SHOULDER
STA.	– DENOTES STATION
TYP.	– DENOTES TYPICAL
U/S	– DENOTES UNDERSIDE
WP.	– DENOTES WORKING POINT

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS		
DATE	DETAILS	BY
2026-06-26	ISSUED FOR TENDER	SMC

CAUTION
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NOT ISSUED FOR CONSTRUCTION

DATE:	2026-06-26
DRAWN:	E.C.
DESIGNED:	T.Z.
CHECKED:	R.M.
ENGINEER:	S.M.C.
APPROVED:	D.J.O.

MUNICIPALITY OF | MUNICIPALITÉ DE MARKSTAY WARREN

R.V. ANDERSON ASSOCIATES LIMITED
Innovative solutions for complex challenges

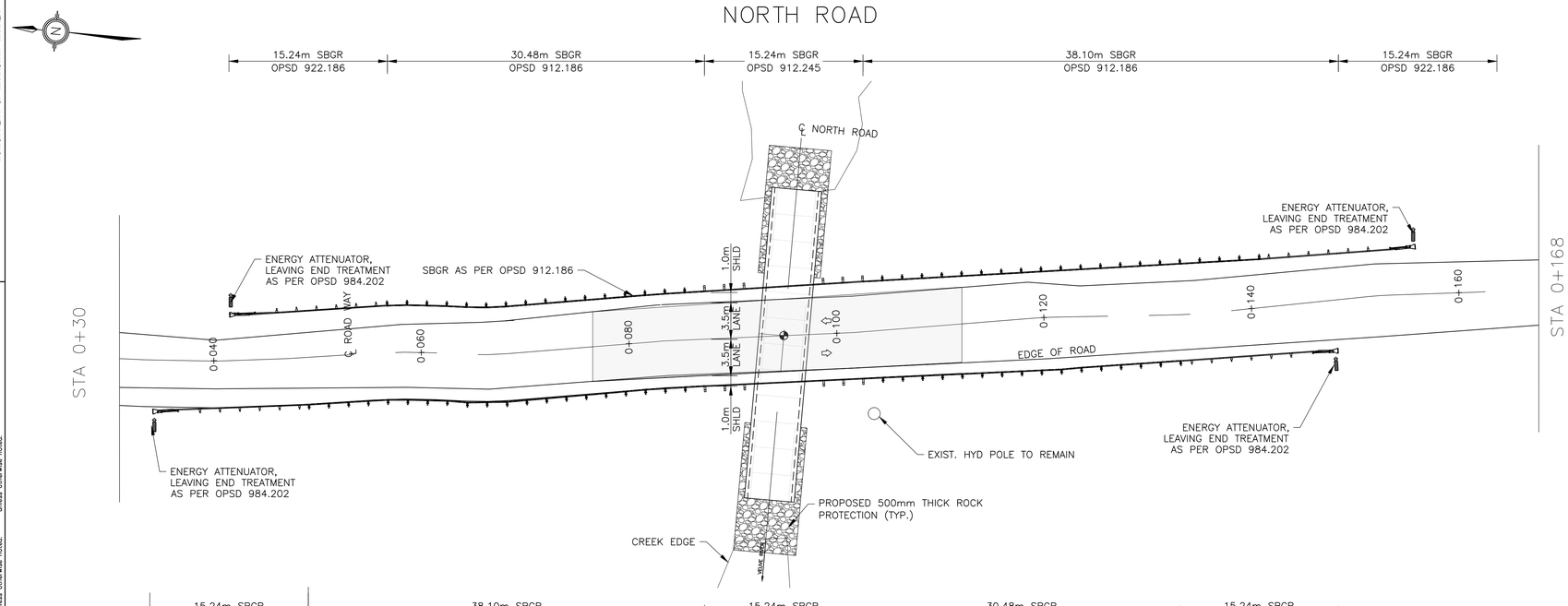
DUPUIS CULVERT 011
GENERAL ARRANGEMENT

SCALE: AS SHOWN
CONTRACT NO.: TMW-2026-08
CAD/FILE NUMBER: 237107
PAGE NO.: 6

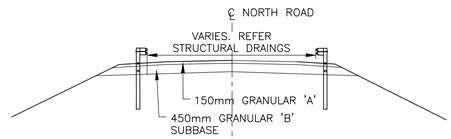
MUNICIPALITY OF MARKSTAY-WARREN

NOTES:
1. All dimensions are in metres unless otherwise noted.
2. # denotes buildings plotted from O.L.S. Plan.
3. ◆ denotes basement floor elevation, with house number.
4. All ◆ denotes basement floor elevations are inverts unless otherwise noted.
5. All sanitary sewer connections are 100mm PVC SDR28 unless otherwise noted.
6. All sanitary and storm sewer elevations are inverts unless otherwise noted.

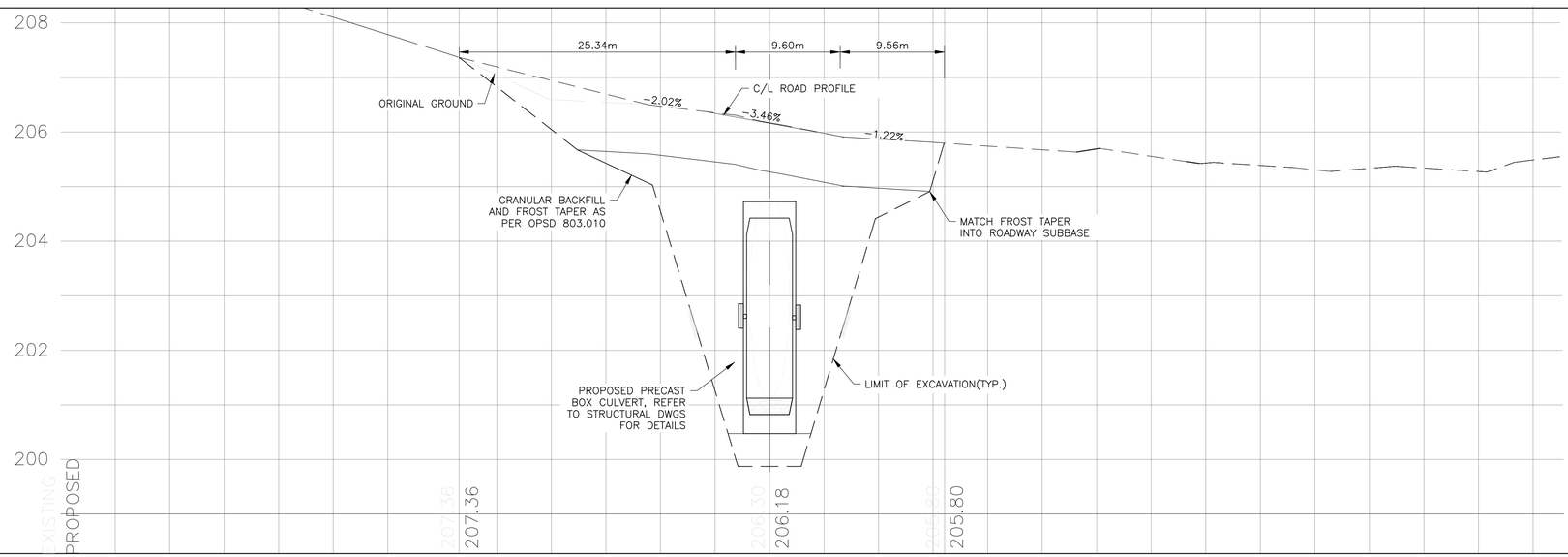
NORTH ROAD



PLAN
1:250



TYPICAL ROAD SECTION
N.T.S



REVISIONS		
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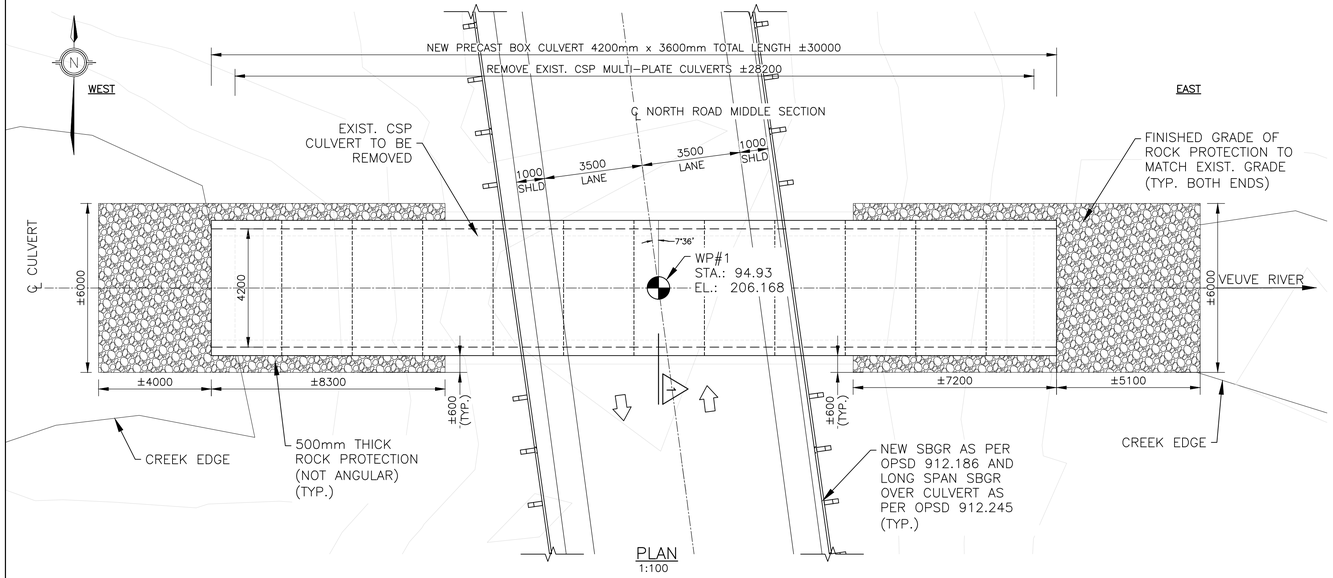
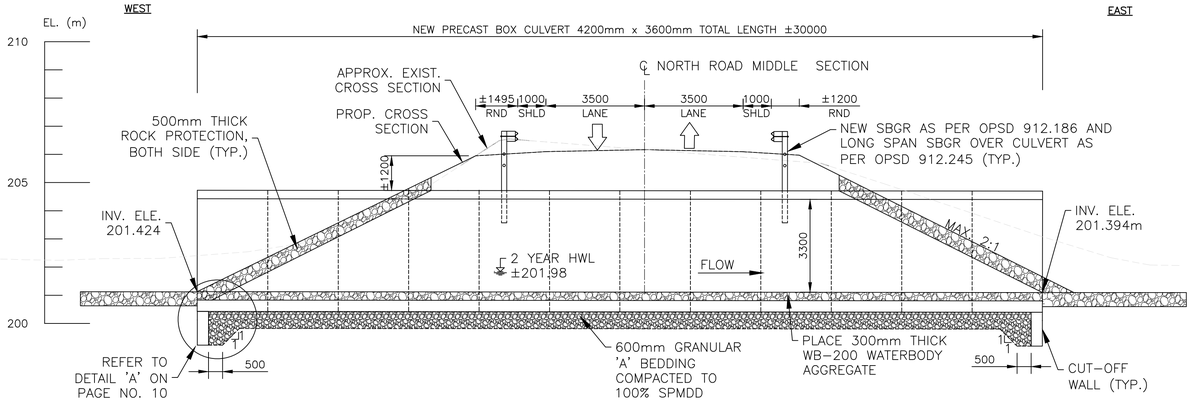
MUNICIPALITY OF | MUNICIPALITÉ DE
MARKSTAY WARREN

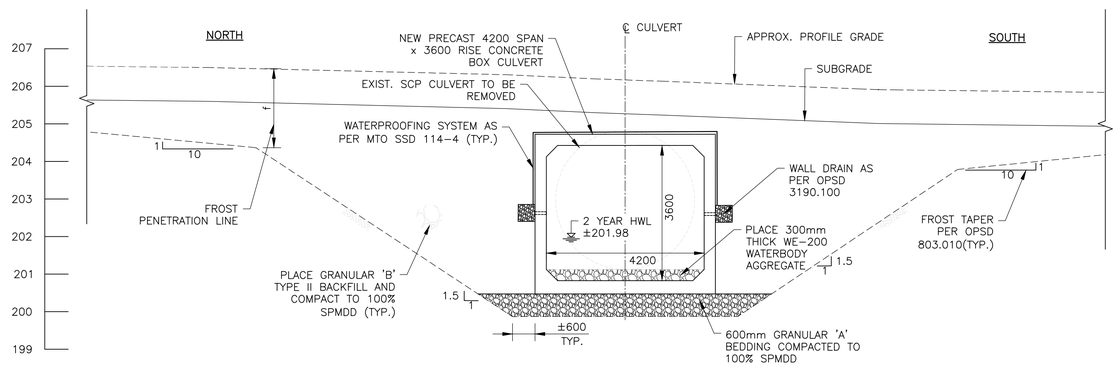
R.V. ANDERSON ASSOCIATES LIMITED
Innovative solutions for complex challenges

NORTH ROAD CULVERT
STA 30 TO STA 0+168
NORTH ROAD
MUNICIPALITY OF MARKSTAY-WARREN

SCALE:	1:250 HOR. 1:50 VER.
CONTRACT NO.:	TMW-2026-08
CAD/FILE NUMBER:	237107
PAGE NO.:	7





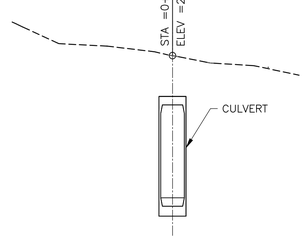


1 CROSS-SECTION
1:75

NOTE: SECTION PERPENDICULAR TO C/L OF CULVERT

GENERAL NOTES:

1. PRECAST CULVERT ELEMENTS SHALL BE DESIGNED BY THE FABRICATOR IN ACCORDANCE WITH CHBDC S6-25 AND AS SPECIFIED IN THE CONTRACT DOCUMENT.
2. CLASS OF CONCRETE
   PRECAST CULVERT C1-45 MPa
   CAST IN PLACE C1-35 MPa
   UNLESS OTHERWISE NOTED
3. REINFORCING STEEL SHALL BE GRADE 500, CONFORM TO CSA STANDARD G30.18M, GRADE 500W. WELDED WIRE FABRIC.(WWF) SHALL BE GARDE 500. LAP REINFORCING BARS 40 BAR DIAMETERS AT SPLICES UNLESS OTHERWISE INDICATED ON THE DRAWING.
4. CLEAR COVER TO REINFORCING STEEL
   PRE-CAST CONCRETE
   TOP SLAB 55±10
   BOTTOM 40±10
   REMAINDER 55±10
   CAST-IN-PLACE CONCRETE
   REMAINDER 70±20
   UNLESS OTHERWISE NOTED
5. CONTRACTOR IS ADVISED THAT THE CURRENT GRAVEL ROAD PROFILE MAY VARY FROM THE PROFILE SHOWN ON THIS DRAWING. THE CONTRACTOR SHALL UNDERTAKE A TOPOGRAPHIC SURVEY PRIOR TO CONSTRUCTION, AND GRAVEL ROAD RESTORATION TO MATCH PRE-CONSTRUCTION ROAD PROFILE.
6. CHAMFER ALL EXPOSED CONCRETE EDGES 25x25 UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
7. ALL SERVICES/UTILITIES ARE TO BE ACCURATELY LOCATED PRIOR TO CONSTRUCTION AND PROTECTION PROVIDED AT ALL TIMES. ANY INTERFERENCE OF EXISTING SERVICES/UTILITIES WITH PROPOSED STRUCTURE OR CONSTRUCTION OPERATION IS TO BE PREPORTED TO THE CONTRACT ADMINISTRATION PRIOR TO CONSTRUCTION.
8. BACKFILL ON EACH SIDE OF THE CULVERT SHALL BE COMPLETED SIMULTANEOUSLY. AT NO TIME SHALL THE BACKFILL LEVELS ON EACH SIDE DIFFER BY MORE THAN 300mm.
9. CUT-OFF WALLS SHALL BE CAST AGAINST UNDISTURBED SOIL.
10. NO CONCRETE OR BEDDING SHALL BE PLACED UNTIL THE EXCAVATION HAS BEEN APPROVED BY THE CONTRACT ADMINISTRATOR.
11. ALL ACTIVITIES SHALL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER COURSE.
12. REFER TO ROAD CONSTRUCTION STAGING DRAINGS TO MAINTAIN TRAFFIC AND WORK SEQUENCE DETAILS.
13. WATERPROOF TOP AND SIDES OF CULVERT (ALONG FULL LENGTH OF ENTIRE CULVERT).
14. TOP SLAB AND WALL WATERPROOF SHALL BE SELF ADHERING SHEET WATERPROOFING BELOW GRADE WATERPROOFING MEL-ROL BY W.R.MEADOWS INSTALLED IN ACCORDANCE WITH THE MANUFACTURES INSTRUCTIONS.
15. PROTECTION BOARD ABOVE WATERPROOFING REQUIRED BELOW GRANULAR FILL ON TOP OF CULVERT.



PROFILE OF NORTH ROAD MIDDLE
N.T.S.

	WATER LEVEL (m)					
	2 YEAR	5 YEAR	10 YEAR	25 YEAR	50 YEAR	100 YEAR
FLOW (m^3/s)	5.4	6.7	9.5	11.7	13.3	14.8
ELEV. (m)	201.98	202.1	202.35	202.54	202.66	202.78

ENVIRONMENTAL NOTES:

1. IN-WATER WORK IN VEUVE RIVER (WORK BELOW THE HIGHWATER MARK OF THE WATERCOURSE) IS ONLY PERMITTED BETWEEN JUNE 16 AND AUGUST 31. THIS INCLUDES COFFERDAM INSTALLATION/OPERATION/REMOVAL.
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CSP.	– DENOTES CORRUGATED STEEL PIPE
DIA.	– DENOTES DIAMETER
E.G.	– DENOTES EXISTING GROUND
ELE.	– DENOTES ELEVATION
EXIST.	– DENOTES EXISTING
HWL.	– DENOTES HIGH WATER LEVEL
INV.	– DENOTES INVERT
MIN.	– DENOTES MINIMUM
MAX	– DENOTES MAXIMUM
N.T.S.	– DENOTES NOT TO SCALE
PROP.	– DENOTES PROPOSED
RND.	– DENOTES ROUNDING
S.B.G.R.	– DENOTES STEEL BEAM GUIDE RAIL
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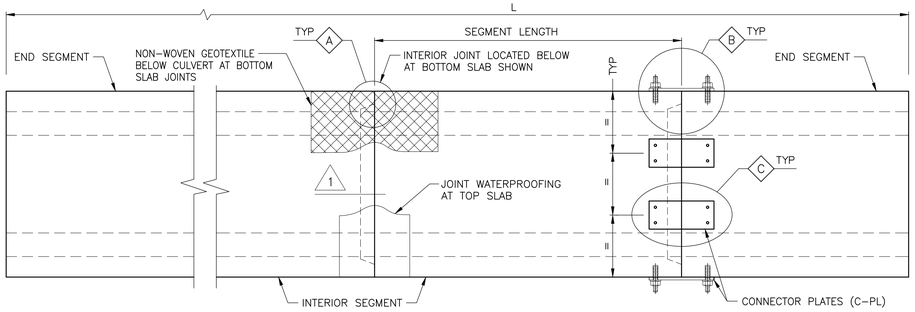
MUNICIPALITY OF | MUNICIPALITÉ DE MARKSTAY WARREN

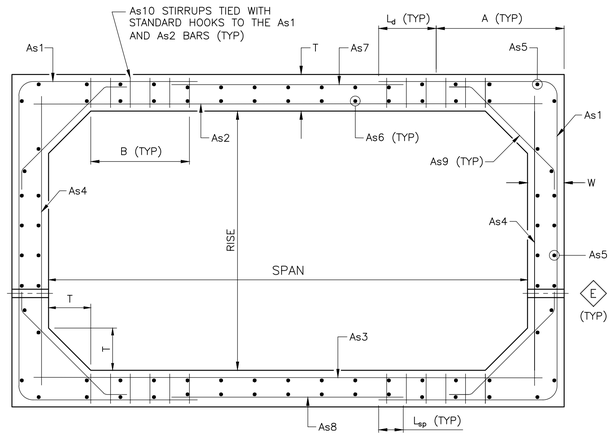
R.V. ANDERSON ASSOCIATES LIMITED
Innovative solutions for complex challenges

NORTH RD MID CULVERT 111
GENERAL ARRANGEMENT

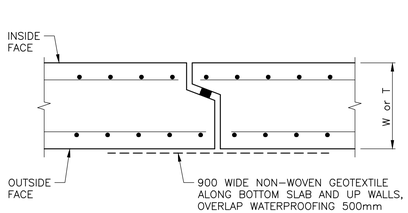
SCALE:	AS SHOWN
CONTRACT NO.:	TMW-2026-08
CAD/FILE NUMBER:	237107
PAGE NO.:	8



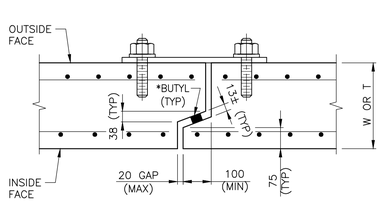
CULVERT PLAN



TYPICAL CULVERT SECTION



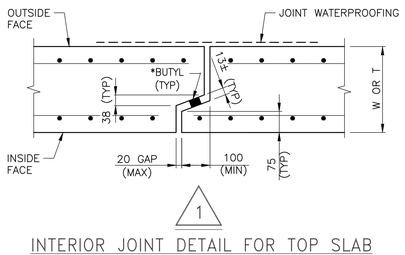
A BOTTOM SLAB AND LOWER PART OF WALLS AT ALL JOINT LOCATIONS



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

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

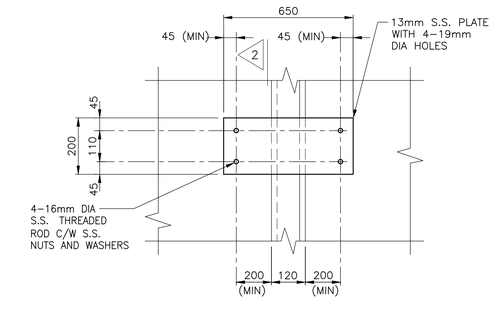
**WATERPROOFING DETAIL SHOWN ELSEWHERE IN THE CONTRACT



INTERIOR JOINT DETAIL FOR TOP SLAB AND TOP PART OF WALLS

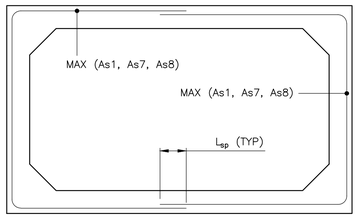
*BUTYL SHALL BE SIZED TO COMPLETELY SEAL THE JOINT AGAINST WATER LEAKAGE

**WATERPROOFING DETAIL SHOWN ELSEWHERE IN THE CONTRACT

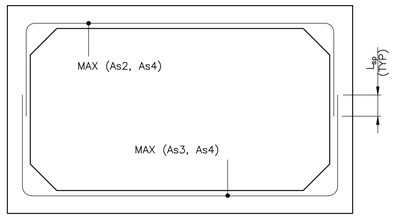


C CONNECTOR PLATE

(*WATERPROOFING DETAIL SHOWN ELSEWHERE IN THE CONTRACT)

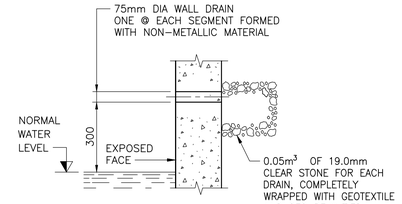


TYPE C OUTER CAGE

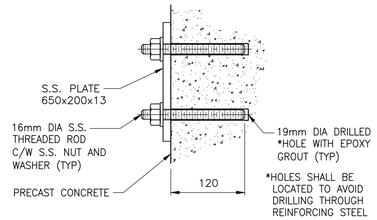


TYPE U INNER CAGE

REINFORCEMENT LAYOUT OPTIONS



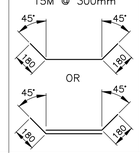
E WALL DRAIN (TYP)



2

TABLE 2

TABLE OF REINFORCEMENT

LOC	MARK	MAX SIZE	'DEFAULT' LAYOUT	
			AREA OF STEEL (mm^2/m) 500W OR 485 MPa WWR	DETAILS**
OUTER CAGE	As1	***	***	
	As7	***	***	STRAIGHT
	As8	***		STRAIGHT
INNER CAGE	As2	SEE*	***	STRAIGHT
	As3		***	STRAIGHT
	As4	***	***	STRAIGHT
TEMP. STEEL	As5	***	***	STRAIGHT
	As6	***	***	STRAIGHT
HAUNCH	As9	***	***	15M @ 300mm 
STIRRUP	As10		***	

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.

***DESIGN BY CONTRACTOR

TABLE 1

TABLE OF DIMENSIONS (mm)

	CULVERT 011	CULVERT 111
CULVERT LENGTH, L	27500	30000
SPAN	5400	4200
RISE	4200	3600
SLAB THICKNESS, T	400	400
WALL THICKNESS, W	350	350
INFLECTION POINT, A	*	*
STIRRUP LENGTH OF NEED, B	*	*
NO OF JOINTS FROM EACH END REQUIRING C-PL	3	3
NO OF C-PL AT TOP SLAB PER JOINT	2	2
NO OF C-PL AT SIDE WALLS PER JOINT	2	2

NOTES:

*DESIGN BY CONTRACTOR

GENERAL NOTES:

1. MINIMUM CONCRETE STRENGTH AT 28 DAYS, 45 MPa.
2. CLEAR COVER TO REINFORCING STEEL SHALL BE 50±10mm UNLESS OTHERWISE NOTED.
3. REINFORCING STEEL SHALL BE GRADE 500W UNLESS OTHERWISE SPECIFIED.
4. WWR REINFORCEMENT SHALL BE IN ACCORDANCE WITH ASTM A1064 AND HAVE A MINIMUM YIELD STRENGTH OF 485 MPa, UNLESS OTHERWISE SPECIFIED.
5. 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 1000mm²/m² FOR 400 MPa STIRRUPS. STIRRUPS SIZES SHALL BE D5 TO D8 DEFORMED WIRES PER ASTM A1064 OR BARS OF EQUIVALENT DIAMETERS.
6. BAR DEVELOPMENT L_d SHALL NOT BE LESS THAN:

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

7. ALL SPLICES SHALL BE CLASS B. THE SPLICE LENGTH SHALL BE, $L_{sp} = 1.3 \times L_d$
8. 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".
9. 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.
10. CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF LIFTING ANCHORS.
11. 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.
12. FOR HEADWALL, WINGWALL, APRON, OR CUT-OFF WALL DETAILS REFER TO OTHER DRAWINGS OF THE CONTRACT.
13. NORMAL WATER LEVEL FOR DRAIN SETTING CAN BE FOUND ELSEWHERE IN CONTRACT.
14. MAXIMUM SEGMENT LENGTH=3.0m. MINIMUM INTERIOR SEGMENT LENGTH=1.5m, MINIMUM END SEGMENT LENGTH=1.8m, BUT NOT < 90% OF INTERIOR SEGMENT.
15. LEGEND: C-PL – CONNECTOR PLATES
    LONGITUDINAL DIRECTION – DIRECTION ALONG THE LENGTH OF THE CULVERT

CONSTRUCTION NOTES:

1. 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.
2. 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.

APPLICABLE STANDARD DRAWINGS:

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

REFER TO STRUCTURAL MANUAL FOR PROFESSIONAL ENGINEER STAMPING REQUIREMENTS.

MODIFIED

STANDARD DRAWING DECEMBER 2020	SS114-4
PRECAST RIGID FRAME BOX CULVERT	

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS		
DATE	DETAILS	BY
2026-06-26	ISSUED FOR TENDER	S.M.C.

CAUTION

- ALL UTILITIES ARE NOT NECESSARILY SHOWN ON THIS DRAWING.
- WHERE UTILITIES ARE SHOWN, LOCATIONS ARE NOT GUARANTEED
- LOCATION & SIZE OF ALL UTILITIES MUST BE VERIFIED IN THE FIELD.

NOT ISSUED FOR CONSTRUCTION

DATE:	2026-06-26
DRAWN:	E.C.
DESIGNED:	T.Z.
CHECKED:	R.M.
ENGINEER:	S.M.C.
APPROVED:	D.J.O.

MUNICIPALITY OF | MUNICIPALITÉ DE MARKSTAY WARREN

R.V. ANDERSON ASSOCIATES LIMITED
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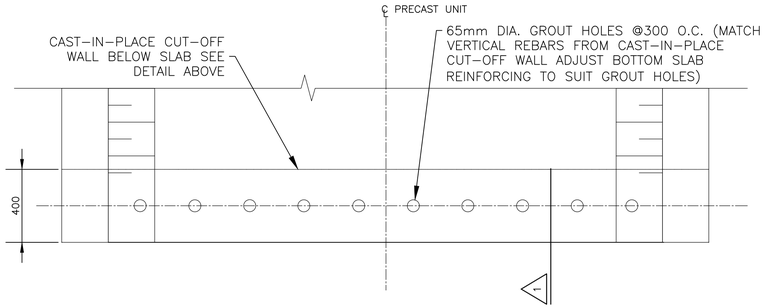
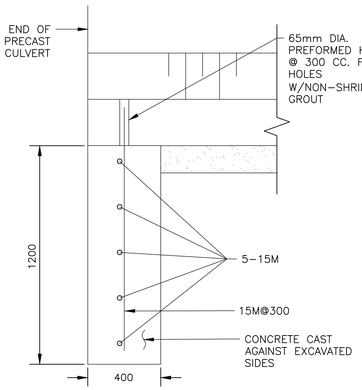
PRECAST BOX CULVERT
DETAILS 1

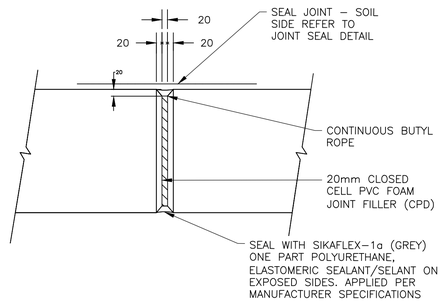
SCALE:	N.T.S.
CONTRACT NO.:	TMW-2026-08
CAD/FILE NUMBER:	237107
PAGE NO.:	9



A END UNIT GROUT HOLES DETAIL
N.T.S.



1 C.I.P. CUT–OFF WALL DETAIL
N.T.S.



EXPANSION JOINT DETAIL
N.T.S.

REVISIONS		
DATE	DETAILS	BY
2026–06–26	ISSUED FOR TENDER	S.M.C.

CAUTION

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NOT ISSUED FOR CONSTRUCTION

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CHECKED:	R.M.
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APPROVED:	D.J.O.

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PRECAST BOX CULVERT
DETAILS 2

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PAGE NO.:	10