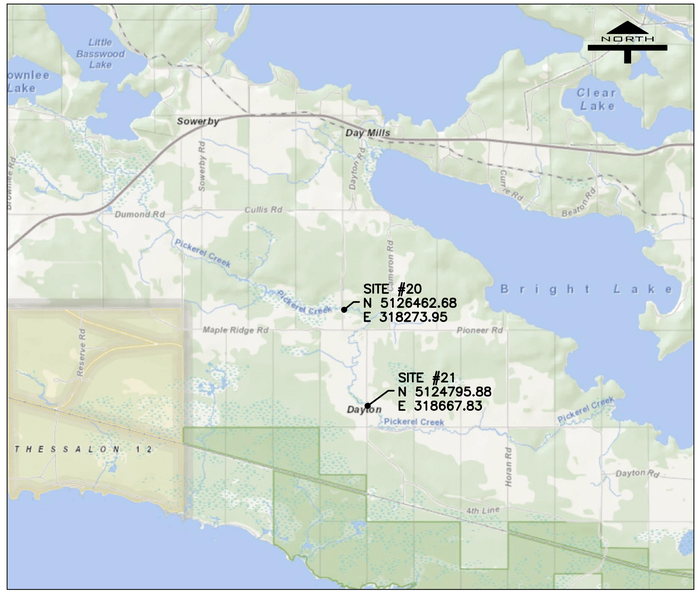
DAYTON ROAD / PICKEREL CREEK
CULVERT #20 & #21 REPLACEMENT

MUNICIPALITY OF HURON SHORES



KEY PLAN
SCALE=1:250

LIST OF DRAWINGS

No.	Rev.	DRAWING DESCRIPTION
G1	0	GENERAL NOTES & CONSTRUCTION SEQUENCING
G2	0	TYPICAL DETAILS
C1	0	EXISTING SITE PLAN / ENVIRONMENTAL & DEWATERING SEDIMENT CONTROL – SITE #20
C2	0	PROPOSED CULVERT GENERAL ARRANGEMENT PLAN & DETAILS – SITE #20
C3	0	EXISTING SITE PLAN / ENVIRONMENTAL & DEWATERING SEDIMENT CONTROL – SITE #21
C4	0	PROPOSED CULVERT GENERAL ARRANGEMENT PLAN & DETAILS – SITE #21

MUNICIPALITY OF HURON SHORES

TULLOCH

PROJECT No. 25-1449

GENERAL NOTES:

1. ONTARIO PROVINCIAL STANDARD SPECIFICATIONS AND ONTARIO PROVINCIAL STANDARD DRAWINGS TO APPLY UNLESS OTHERWISE NOTED.
2. ALL EROSION AND SEDIMENT CONTROLS SHALL FOLLOW AND BE IN ACCORDANCE WITH GENERAL BEST MANAGEMENT PRACTICES PRIOR TO UNDERTAKING WORKS.
3. NOTIFY ALL UTILITY DEPARTMENTS 72 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION. UTILITY PERSONNEL TO BE ON SITE WHEN EXCAVATING ADJACENT TO UNDERGROUND UTILITIES.
4. SUPPORT UTILITIES IN ACCORDANCE WITH THE DIRECTIONS AND GUIDELINES OF THE IMPACTED UTILITY.
5. COMPLETE ALL TRENCHING IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH & SAFETY ACT.
6. THE LOCATION OF UTILITIES SHOWN ON DRAWINGS IS APPROXIMATE AND MAY BE INCOMPLETE. CONFIRM EXACT LOCATION OF UTILITIES WITH MINISTRY, MUNICIPALITY OR UTILITIES. THE CONTRACTOR IS RESPONSIBLE TO DETERMINE LOCATIONS OF ALL UTILITIES PRIOR TO CONSTRUCTION AND WILL BE RESPONSIBLE FOR PROTECTING AGAINST DAMAGE. THE CONTRACTOR ASSUMES ALL LIABILITY FOR DAMAGE TO UTILITY AND ROAD WORKS.
7. COMPLY WITH THE REQUIREMENTS OF THE MUNICIPALITY OF HURON SHORES IN REGARDS TO TRAFFIC FLOW.
8. REPLACEMENT OF STRUCTURE CAN BE COMPLETED UNDER A FULL ROAD CLOSURE.
9. ALL INSTALLATIONS ARE TO BE COMPLETED TO THE SATISFACTION OF THE ENGINEER AND THE MUNICIPALITY OF HURON SHORES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
10. CONSTRUCTION SHALL ADHERE TO THE ASSOCIATE WORK WINDOWS FOR WORKS IN OR NEAR WATER BODIES AND WETLANDS.

CONSTRUCTION NOTES:

1. CONTRACTOR SHALL CHECK & VERIFY ALL DIMENSIONS ARE APPROPRIATE BEFORE PROCEEDING WITH WORK.
2. CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE COMMENCING WORK.
3. CULVERT ENGINEERED BACKFILL ZONES AND FOUNDATION BEDDING SHALL CONSIST OF LOCALLY AVAILABLE GRANULAR 'A' MATERIAL OR CLEAR STONE AS REQUIRED AND BE COMPACTED TO 100% SPMDD. BACKFILL SHALL BE PLACED IN MAXIMUM 200mm LIFTS KEPT AT THE SAME ELEVATIONS ON BOTH SIDES OF THE CULVERTS.
4. MINIMUM HEIGHT OF FILL OVER THE TOP OF THE CULVERT SHALL BE 850mm OR AS INSTRUCTED BY THE PIPE ARCH SUPPLIER FOR ANY CONSTRUCTION LOADS.
5. CULVERT SHALL NOT BE PLACED UNTIL THE DEPTH OF EXCAVATION AND ADEQUATE SUBBASE FOUNDATION HAS BEEN APPROVED BY THE OWNERS REPRESENTATIVE. OVEREXCAVATION AND BASE STABILIZATION MAY BE REQUIRED SHOULD SOFT SOILS BE ENCOUNTERED THAT DO NOT MEET THE BEARING CAPACITY REQUIREMENTS OF THE PIPE ARCH SUPPLER.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND VERIFYING ALL EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION AND PROTECT THEM FROM DAMAGE.
7. EROSION AND SEDIMENT CONTROLS TO BE INSTALLED PRIOR TO START OF CONSTRUCTION AND AMENDED OR MODIFIED DURING CONSTRUCTION AS REQUIRED.
8. CULVERT FOOTING BEDDING SHALL BE A MINIMUM 300mm IN THICKNESS AND SHAPED TO RECEIVE THE ARCH PIPE IN ACCORDANCE WITH THE PIPE ARCH SUPPLIERS' INSTALLATION INSTRUCTIONS & SPECIFICATIONS.
9. CONTRACTOR TO RECEIVE AND INSTALL NEW MULTI-PLATE PIPE ARCH SUPPLIED BY THE MUNICIPALITY IN ACCORDANCE WITH THE SUPPLIERS INSTALLATION DRAWINGS AND SPECIFICATIONS.

ENVIRONMENTAL NOTES:

1. IN-WATER WORK TIMING RESTRICTION: WORK WILL BE UNDERTAKEN BETWEEN JUNE 16th AND MARCH 15th OF THE FOLLOWING YEAR AS PER THE MNR CRITICAL TIMING WINDOW RESTRICTIONS.
2. IN-WATER ISOLATION AND FISH SALVAGE: ALL IN-WATER WORK AREAS MUST BE ISOLATED AS PER DFO ISOLATION STANDARDS PRIOR TO UNDERTAKING IN-WATER WORK OR DEWATERING. FISH SALVAGES ARE REQUIRED IN THE ISOLATED WORK AREA AS REQUIRED UNDER THE FISHERIES ACT. A QUALIFIED BIOLOGIST MUST UNDERTAKE THE FISH SALVAGE PRIOR TO IN-WATER WORK, UNDER A LICENSE TO COLLECT FISH ISSUED BY THE MNR. DEWATERING MUST FOLLOW DFO'S END-OF-PIPE FISH PROTECTION SCREEN INTERIM CODE OF PRACTICE.
3. REGULAR SITE INSPECTIONS: REMAIN VIGILANT AND REGULATORY INSPECT THE WORK SITE FOR WILDLIFE AND SPECIES AT RISK. WILDLIFE THAT IS NOT A LISTED SPECIES AT RISK MAY BE CAREFULLY REMOVED OR RELOCATED. STOP WORK AND CONSULT WITH A QUALIFIED ENVIRONMENTAL PROFESSIONAL IF SPECIES AT RISK ARE ENCOUNTERED WITHIN THE WORK AREA.
4. SPILL PREVENTION AND RESPONSE: A SPILLS PREVENTION AND RESPONSE PLAN WILL BE PREPARED IN ADVANCE OF THE START OF THE WORK. ONE OR MORE ADEQUATELY STOCKED SPILL KITS WILL BE PRESENT ON THE SITE AT ALL TIMES AND STAFF WILL BE TRAINED IN PROPER APPLICATION. REPORT ALL SPILLS TO 1-866-MOE-TIPS (663-8477).
5. ENVIRONMENTAL PERMITTING COMPLIANCE: WORK WILL NOT BEGIN UNTIL APPROVALS ARE RECEIVED FROM MNR AND DFO REGARDING ENVIRONMENTAL WORK PERMITS / PERMISSIONS. ALL WORK IS TO BE UNDERTAKEN FOLLOWING ENVIRONMENTAL MITIGATIONS INCLUDED IN THE PERMITS AND PERMIT APPLICATIONS. PERMITS WILL BE SUPPLIED TO CONTRACTOR UPON AWARD.
6. SEDIMENT BARRIERS SHALL BE INSTALLED PRIOR TO THE BEGINNING OF CONSTRUCTION.
   - A TURBIDITY CURTAIN WILL BE PLACED AT THE UPSTREAM & DOWNSTREAM EXTENT OF THE IN-WATER WORK (OPSD 219.260 & 219.261)
   - A TEMPORARY SANDBAG DAM (219.150) WILL BE PLACED TO ISOLATE THE IN-WATER WORK AREA. A TEMPORARY BY-PASS CULVERT OR PUMPING SYSTEM WILL BE INSTALLED TO PROVIDE CONTINUOUS FLOW OF WATER DURING THE REPLACEMENT. ANY BY-PASS PUMP SYSTEM OR DEWATERING WILL BE OUTFITTED WITH AN END OF PIPE SCREEN TO PREVENT ENTRAPMENT OF FISH. TEMPORARY ROCK PROTECTION WILL BE INSTALLED ON THE OUTLET OF THE BYPASS CULVERT TO CONTROL SEDIMENT AS WELL AS PREVENT FISH ENTRY INTO THE PIPE.
   - ONCE ISOLATED, A FISH SALVAGE UNDER A MNR LCFSP WILL BE UNDERTAKEN BY A FISHERIES PROFESSIONAL. ALL FISH WILL BE REMOVED AND RELOCATED OUTSIDE OF THE ISOLATED WORK AREA.
   - A TEMPORARY DIVERSION CHANNEL WILL BE CONSTRUCTED AS PER OPSD 221.030 TO ALLOW FOR WATER TO BY-PASS THE EXISTING CULVERT DURING REMOVAL AND REINSTALLATION. A TEMPORARY SANDBAG DAM WILL BE USED TO DIVERT WATER THROUGH THE BYPASS CHANNEL/CULVERT SYSTEM.
   - THE EXISTING CULVERT WILL BE REMOVED AND REPLACED WITH A NEW POLYMER COATED STEEL MULTI-PLATE ARCH PIPE STRUCTURE (SPAN 4.3m AND RISE OF 2.9m) COMPLETE WITH CONCRETE CUT-OFF WALLS AT THE INLET AND OUTLETS OF THE CULVERT. THE NEW CULVERT WILL BE PLACED TO MATCH THE CHANNEL SLOPE OF APPROXIMATELY 0.5% SLOPE.
   - THE CULVERT WILL HAVE A 200mm EMBEDMENT TO ALLOW NATURAL SEDIMENTATION TO OCCUR THROUGHOUT THE CULVERT FLOOR TO MATCH STREAM CONDITIONS.
   - RIPRAP STABILIZATION WILL OCCUR AT THE AT THE INLET AND OUTLET OF THE CULVERT CONSISTING OF A 2000mm APRON OF 300mm ROCK PROTECTION. THE PROTECTION WILL BE PLACED TO MATCH THE EXISTING CREEK CROSS-SECTION.
   - WATER WILL SLOWLY BE INTRODUCED INTO THE NEW CULVERT BY DAMMING FLOW FROM ENTERING THE TEMPORARY BY-PASS CHANNEL/CULVERT.
   - RETURN THE SITE TO EXISTING CONDITIONS.

CONSTRUCTION SEQUENCE

1. PERFORM THE WORK DURING LOW FLOW SITUATIONS WHERE FLOW IS AT A MINIMUM ALLOWING INSTALLATION IN THE DRY.
2. CULVERT REPLACEMENT TO BE COMPLETED IN AN ISOLATED WORK ZONE BETWEEN JUNE 16th AND MARCH 15th OF THE FOLLOWING YEAR.
3. INSTALL A TURBIDITY CURTAIN + OIL ABSORBING BOOM UPSTREAM AND DOWNSTREAM BEYOND LIMITS OF COFFER DAMS.
4. RE-SLOPE THE APPROACHES TO THE CREEK BED TO ALLOW SAFE ACCESS, CHANNEL DIVERSION PREPARATION AND INSTALLATION OF THE NEW CULVERT. REMOVE THE OLD CULVERT FROM THE CREEK BED AND DISPOSE OF AT AN APPROVED SITE.
5. DIVERT ANY CREEK FLOW PARALLEL TO THE FOUNDATION AREA TO ALLOW FOR FOUNDATION PREPARATION AND INSTALLATION OF THE NEW ARCH PIPE BEDDING MATERIALS IN THE DRY.
6. UPON ISOLATING THE WORK AREA, A FISH SALVAGE IS REQUIRED TO BE COMPLETED BY FISHERIES PROFESSIONALS UNDER AN MNRF LCFSP.
7. ONCE EXISTING CULVERT WORK ZONE HAS BEEN CLEARED OF FISH, DEWATERING AND EXISTING CULVERT REMOVAL SHALL BE COMPLETED TO EXPOSE SUBSTRATE AND FOUNDATION MATERIAL AT BOTTOM OF THE PROPOSED CULVERT BEDDING ELEVATION.
8. GEOTECHNICAL ENGINEER SHALL INSPECT AND APPROVE FOUNDING MATERIAL BEFORE PLACEMENT OF BEDDING MATERIAL. INSTALLATION OF GEOTEXTILE AND ANY FOUNDATION STABILIZATION (AS REQUIRED).
9. CONSTRUCT THE CONCRETE CUT-OFF WALLS AT THE INLET AND OUTLETS OF THE NEW ARCH PIPES. HEADWALLS WILL HAVE ANCHOR BOLTS TO RECEIVE THE ENDS OF THE PIPE ARCHES ALONG THE BOTTOM EDGE OF THE PIPES.
10. INSTALLATION OF THE FOUNDATION AND BEDDING GRANULARS TO RECEIVE THE NEW ARCH PIPES.
11. PLACE THE FULL CULVERT BARREL ON THE BEDDING.
12. PLACE THREE-FOUR LIFTS OF COMPACTED BACKFILL ON EACH SIDE OF THE CULVERT BARREL KEEPING LIFTS AT THE SAME ELEVATION ON EITHER SIDE. ADVANCE CULVERT BACKFILL (EQUAL ON BOTH SIDES) TO THE SPRING LINE.
13. PLACE 150-250mmØ/ RIP RAP 300-400mm THICK ON HEAVY DUTY NON-WOVEN GEOTEXTILE (270R OR EQUIV.) SURROUNDING UPSTREAM AND DOWNSTREAM ENDS OF CULVERTS COVERING THE AREA EITHER SIDE OF THE CULVERT UP BEYOND THE HWL.
14. SLOPE SIDE SLOPES ON CULVERT ENDS AT THE APPROACHES TO A STABLE ANGLE OF REPOSE AND PROTECT FROM EROSION USING RIP-RAP. BEYOND RIP RAP THE SIDE SLOPES SHALL BE RECOVERED WITH STRIPPED ORGANICS, IMPORTED TOPSOIL, SEEDED & COVERED WITH MULCH OR BIODEGRADABLE EROSION CONTROL BLANKETS.
15. WITH PARTIAL HEIGHT BACKFILL AND ROCK PROTECTION COMPLETED WITHIN THE ISOLATED WORK ZONE, SLOWLY ALLOW WATER TO ENTER THE NEW PIPE ARCH FROM THE DOWNSTREAM SIDE AND ALLOW SUFFICIENT TIME TO FLOOD THE PREVIOUSLY ISOLATED AREA WITHOUT CAUSING HIGH FLOWS INTO THE NEW PIPE.
16. REMOVE THE SANDBAGS COFFERDAMS AND TRANSITION FLOWS FROM THE BYPASS SYSTEM INTO THE NEW ARCH PIPE.
17. REINSTATE BYPASS CHANNEL MATERIAL AND STABILIZE DISTURBED AREAS TO ORIGINAL STATE AND PROTECT WITH MULCH/STRAW TO PREVENT EROSION.
18. CONTINUE PLACING COMPACTED LIFTS OF BACKFILL AROUND THE CULVERT KEEPING THE SAME ELEVATION ON BOTH SIDES. CONTINUE BACKFILLING TO A FINAL DEPTH OF COVER OF AT LEAST 850mm OR AS REQUIRED BY PIPE ARCH SUPPLIER/DESIGN GRADES.
19. PROTECT THE SIDE SLOPES OF THE ROADWAY AROUND THE CULVERT WITH 150-250mmØ/ RIP RAP 300-400mm THICK ON HEAVY DUTY NON-WOVEN GEOTEXTILE (270R OR EQUIV.). SIDESLOPES BEYOND THE ENGINEERED ZONE CAN BE REINSTATED WITH RECLAIMED TOPSOIL, SEEDED AND COVERED WITH 50mm OF MULCH/STRAW TO PROTECT FROM EROSION UNTIL SEED OR NATURE VEGETATION TAKE HOLD.
20. INSTALL SEDIMENT CONTROL FENCING ALONG BASE OF ROADSIDE SLOPES AT THE FENCE LINES AND REINSTALL ANY DISTURBED FENCING BACK TO MATCH ORIGINAL CONDITION OR BETTER.
21. INSTALL STEEL BEAM GUIDERAIL ALONG SHOULDERS AS SHOWN IN CONTRACT DRAWINGS.
22. REMOVE THE TURBIDITY CURTAIN + OIL ABSORBING BOOM
23. PERFORM A GENERAL SITE CLEANUP.

BURIED METAL STRUCTURE NOTES:

1. DESIGN STANDARDS, SPECIFICATIONS AND GUIDELINES
   - 1.1. CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA S6-25.
   - 1.2. CANADIAN STANDARD ASSOCIATION (CSA).
   - 1.3. ASTM STANDARDS.
   - 1.4. CSPI HANDBOOK OF STEEL DRAINAGE AND HIGHWAY CONSTRUCTION
   - 1.5. CSPI PERFORMANCE GUIDELINE TECHNICAL BULLETIN 13.
2. DESIGN PARAMETERS
   - 2.1. LIVE LOAD: CL-625-ON, CAN/CSA-S6-25 (CHBDC).
   - 2.2. DESIGN UNIT WEIGHT OF SOIL = 23 kN/m³. DESIGN UNIT WEIGHT INCLUDES WEIGHT OF WATER (MAXIMUM DRY DENSITY x (1 + OPTIMUM MOISTURE CONTENT PERCENTAGE).
   - 2.3. DESIGN HEIGHT OF COVER = 850-1000mm FROM BARREL CROWN. INCLUDING MAINTENANCE AND OPERATIONAL VARIANCES.
   - 2.4. DESIGN SERVICE LIFE = 75 YEARS. CORROSION LOSS CALCULATED PER CSA S6.25 (CHBDC) PERFORMANCE GUIDELINES FOR SOIL SIDE CORROSION, AND NON-AGGRESSIVE WATER CORROSION LOSS.
   - 2.5. SEISMIC ACCELERATION RATIO = 0.15 (2% PROBABILITY OF EXCEEDANCE IN 50 YEARS).
3. MATERIAL WITHIN THE ENGINEERING BACKFILL ZONE
   - 3.1. BACKFILL TO BE GRANULAR A OR GRANULAR B TYPE 2 PER OPSS 1010, OR PER AIL REQUIREMENTS.
   - 3.2. STANDARD PROCTOR COMPACTION: 98% OF LABORATORY MAX. DRY DENSITY.
   - 3.3. BACKFILL PLACEMENT SHALL BE PER THE MANUFACTURER INSTRUCTIONS.
4. BOLT-A-PLATE STRUCTURAL PLATE STRUCTURE
   - 4.1. STRUCTURAL PLATE CORRUGATED STEEL PIPE (SPCSP) STRUCTURE TO BE BOLT-A-PLATE AS SUPPLIED BY THE MUNICIPALITY THROUGH ATLANTIC INDUSTRIES.
   - 4.2. CORRUGATION TO BE 152x51, TYPE 1 STRUCTURAL PLATE PER CSA G401.
   - 4.3. STRUCTURE PLATE THICKNESS: 6mm OR DESIGN BY MANUFACTURE.
   - 4.4. STRUCTURAL PLATE AND COMPONENT COATING, CSA G401-24: GALVANIZED Z915 (TOTAL ON BOTH SURFACES), CAN/CSA-G164 or BEST-KOTE THERMOPLASTIC COPOLYMER COATING, THICKNESS = 250 UM PER SIDE.
   - 4.5. FASTENER COATING: GALVANIZED PER ASTM A153/A153M AND ASTM F2329 or CSPI STANDARD SPECIFICATION NZF 3000 (SILVER). ANCHOR BOLTS PER ASTM A153/A153M AND ASTM F2329 OR CAN/CSA-G164 CLASS 5.
   - 4.6. PLATE ASSEMBLY PROCEDURE, BOLT TORQUE, AND TOLERANCES PER MANUFACTURE SPECIFICATIONS.
   - 4.7. THE STRUCTURE SHAPE SHALL BE CHECKED DURING BACKFILLING TO MAINTAIN TOLERANCES.
   - 4.8. BACKFILLING DURING COLD WEATHER IS NOT RECOMMENDED. GEOTECHNICAL RECOMMENDATIONS ARE REQUIRED IF BACKFILLING IS TO BE PERFORMED BELOW FREEZING TEMPERATURES, REFERENCE CSPI TECHNICAL BULLETIN 20.
   - 4.9. CONSTRUCTION AND HIGHWAY VEHICLES SHALL NOT PASS OVER THE STRUCTURE UNTIL THE DESIGN MINIMUM HEIGHT OF COVER IS REACHED, OR ALTERNATIVE COVER HEIGHTS ARE PROVIDED BY THE STRUCTURE DESIGNER.

CHANNEL BYPASS FLOWS

THE FOLLOWING ESTIMATED DISCHARGES FOR THE PICKEREL CREEK SHALL BE CONSIDERED WHEN SETTING OUT A BYPASS SYSTEM:

Q_2 = 5.5 m³/s

Q_5 = 8.0 m³/s

CAST-IN-PLACE CONCRETE

1. ALL CONCRETE MATERIALS, FORMWORK, TOLERANCES AND CONSTRUCTION SHALL CONFORM TO CAN/CSA A23.1-04/A23.2-04.
2. REINFORCING STEEL BARS SHALL BE DEFORMED BILLET STEEL BARS, GRADE 400W CONFORMING TO CAN/CSA G30.18-M92 (R2007).
3. THE FABRICATOR SHALL SUPPLY PLACING DRAWINGS AND BAR LISTS IN ACCORDANCE WITH THE REINFORCING STEEL INSTITUTE OF CANADA, MANUAL OF STANDARD PRACTICE, CHAPTER 5, SUBMISSION OF PLACING DRAWINGS AND BAR LISTS.
4. ALL REINFORCING BARS SHALL BE SECURELY TIED, SUPPORTED IN THE FORMS AND SPACED WITH STANDARD ACCESSORIES SO THAT THERE IS NO MOVEMENT DURING CONCRETE PLACEMENT.
5. REINFORCING IS TO BE PLACED IN GENERAL ACCORDANCE WITH REINFORCING STEEL INSTITUTE OF CANADA, MANUAL OF STANDARD PRACTICE, CHAPTER 8. ALL SPLICES SHALL BE CLASS "B" SPLICE, UNLESS OTHERWISE NOTED.
6. CONCRETE COVER TO REINFORCING:

6.A. ALL CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 75mm ± 10mm
6.B. ALL CONCRETE CASE IN EARTH EXPOSED TO:
- CHLORIDES 60mm ± 10mm
- FREEZING AND THAWING ONLY 50mm ± 10mm

6.C. REMAINDER: 50mm ± 10mm (UNLESS OTHERWISE NOTED)

7. ALL REINFORCING STEEL IN PLACE TO BE MADE AVAILABLE FOR INSPECTION BY ENGINEER BEFORE POURING THE CONCRETE. ENGINEER TO BE NOTIFIED WELL IN ADVANCE OF POURING SCHEDULE. ENGINEER TO CARRY OUT INSPECTION AT THEIR DISCRETION.
8. PROVIDE PORTLAND CEMENT OF CANADIAN MANUFACTURE CONFORMING WITH CSA/CAN 3-A5, TYPE 10.
9. PROVIDE CLEAN UNCOATED SAND AND COARSE AGGREGATES FROM APPROVED SOURCES WHICH CONFORM WITH CSA/CAN 3-A2M. NOMINAL SIZE OF COARSE AGGREGATES TO BE 14 mm (½").
10. CONCRETE COMPONENTS SHALL HAVE THE FOLLOWING MATERIAL PROPERTIES, UNLESS NOTED OTHERWISE:

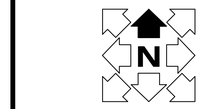
COMPONENT	CLASS OF EXPOSURE	MIN. COMPRESSIVE STRENGTH MPa (psi)	MAX. WATER TO CEMENT RATIO	AIR CONTENT	CURING TYPE
CONCRETE HEAD WALL					
EXTERIOR, UNHEATED	C-1 OR A-1	35 (5,100) AT 56 DAYS	0.400	5%-8%	1

NOTES:

1. CURING TYPE 1 - 10°C FOR 3 DAYS (OR UNTIL 40% OF SPECIFIED STRENGTH IS OBTAINED)
   CURING TYPE 2 - 10°C FOR 10 DAYS (OR UNTIL 70% OF SPECIFIED STRENGTH IS OBTAINED)
2. 'HEATED' REFERS TO A SPACE WHICH WILL BE INSULATED AND/OR MAINTAINED AT OR ABOVE 10°C ON A CONSISTENT BASIS ALL YEAR.

EXPOSURE CLASS	DEFINITION OF EXPOSURE CLASS
N	CONCRETE THAT IS NEITHER EXPOSED TO CHLORIDES NOR TO FREEZING AND THAWING NOR TO SULPHATES, EITHER IN A WET OR DRY ENVIRONMENT.
F-1	CONCRETE EXPOSED TO FREEZING AND THAWING IN A SATURATED CONDITION, BUT NOT TO CHLORIDES.
F-2	CONCRETE IN AN UNSATURATED CONDITION EXPOSED TO FREEZING AND THAWING, BUT NOT TO CHLORIDES
C-1 OR A-1	STRUCTURALLY REINFORCED CONCRETE EXPOSED TO CHLORIDES WITH OUR WITHOUT FREEZING AND THAWING CONDITIONS
C-2 OR A-2	NON-STRUCTURALLY REINFORCED (PLAIN) CONCRETE EXPOSED TO CHLORIDES AND FREEZING AND THAWING
C-3 OR A-3	CONTINUOUSLY SUBMERGED CONCRETE EXPOSED TO CHLORIDES, BUT NOT TO FREEZING AND THAWING
C-4 OR A-4	NON-STRUCTURALLY REINFORCED (PLAIN) CONCRETE EXPOSED TO CHLORIDES, BUT NOT TO FREEZING AND THAWING

11. CONCRETE SLUMPS SHALL BE CONSISTENT AT 80mm (3") ± 20mm (¾"). ADMIXTURES, WHERE APPROVED BY THE ENGINEER, SHALL CONFORM TO CSA STANDARD CAN 3-A266M, AND MAY BE USED TO INCREASE THE SLUMP ABOVE THIS VALUE.
12. CURE CONCRETE FOR DURATION IN THE ABOVE TABLE (CONTINUOUS WET CURE).



KEY PLAN

ENGINEER'S SEAL:

IFT-25-1449

DATE	REV.	REVISION	BY	APP'D
26/04/10	0	ISSUED FOR TENDER	JTS	MK

CLIENT:

MUNICIPALITY OF HURON SHORES

CONSULTANT:

TULLOCH

PROJECT TITLE:

DAYTON ROAD / PICKEREL CREEK CULVERT #20 & #21 REPLACEMENT

DRAWING TITLE:

GENERAL NOTES & CONSTRUCTION SEQUENCING

DRAWN	DESIGNED	CHECKED	APPROVED
JTS	MK	KL	MK

SCALE	DATE
AS NOTED	APR. 10, 2026

PROJECT No.	REVISION	DRAWING
251449	0	G1

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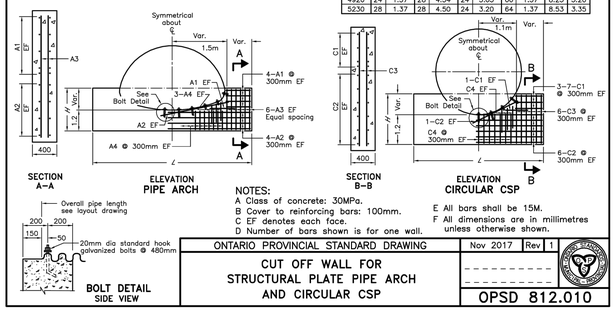
PIPE	A1		A2		A3		A4		L	H
Span	Rise	No	Length m	No	Length m	No	Length m	No	Length m	m	m
3730	2290	20	1.06	20	3.20	24	2.13	36	1.06	6.17	2.28
3890	2690	20	1.06	20	3.27	24	2.13	36	1.06	6.32	2.28
4370	2870	20	1.37	20	3.86	24	2.28	40	1.06	7.46	2.43
4720	3070	20	1.37	20	4.01	24	2.28	42	1.06	7.77	2.43
5050	3330	20	1.37	20	4.19	24	2.28	44	1.06	8.07	2.43
5490	3530	20	1.37	20	4.42	24	2.28	46	1.06	8.53	2.43
5890	3710	20	1.37	20	4.62	24	2.28	50	1.06	8.91	2.43
6250	3910	20	1.37	20	4.80	24	2.28	52	1.06	9.29	2.43

PIPE	C1		C2		C3		C4		L	H
Dia	No	Length m	No	Length m	No	Length m	No	Length m	m	m
3000	16	1.37	28	3.28	24	1.98	32	1.37	6.10	2.13
3050	16	1.37	28	3.35	24	1.98	34	1.37	6.25	2.13
3300	16	1.37	28	3.43	24	2.13	36	1.37	6.40	2.29
3360	16	1.37	28	3.51	24	2.13	38	1.37	6.55	2.29
3600	20	1.37	28	3.58	24	2.29	40	1.37	6.71	2.44
3670	20	1.37	28	3.73	24	2.44	44	1.37	7.01	2.59
3990	20	1.37	28	3.89	24	2.59	48	1.37	7.32	2.74
4300	20	1.37	28	4.04	24	2.74	52	1.37	7.62	2.90
4610	24	1.37	28	4.19	24	2.90	56	1.37	7.93	3.05
4920	24	1.37	28	4.34	24	3.05	60	1.37	8.23	3.20
5230	28	1.37	28	4.50	24	3.20	64	1.37	8.53	3.35



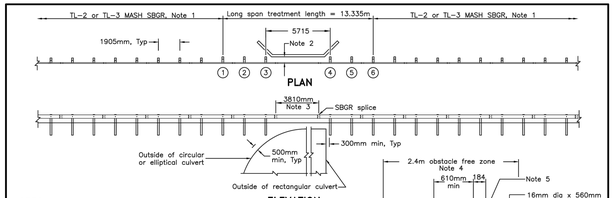
SECTION A–A ELEVATION PIPE ARCH

SECTION B–B ELEVATION CIRCULAR CSP

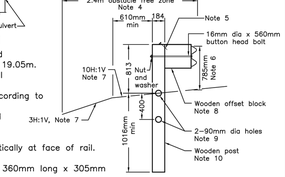
NOTES:
A Class of concrete: 30MPa.
B Cover to reinforcing bars: 100mm.
C EF denotes each face.
D Number of bars shown is for one wall.
E All bars shall be 15M.
F All dimensions are in millimetres unless otherwise shown.

BOLT DETAIL SIDE VIEW

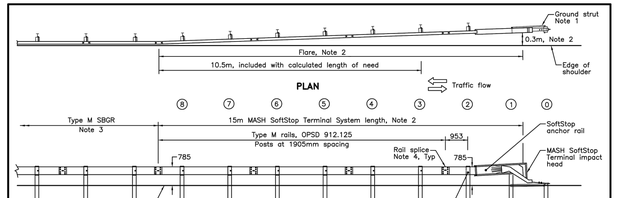
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2017	Rev 1
CUT OFF WALL FOR STRUCTURAL PLATE PIPE ARCH AND CIRCULAR CSP		
	OPSD 812.010	



NOTES:
1 The minimum length of TL–2 or TL–3 MASH SBGR to be installed upstream and downstream of the long span treatment shall be 19.05m.
2 Distance from face of rail to inside face of culvert headwall shall not be less than 900mm.
3 Type M rail, mounting hardware, and splice hardware shall be according to OPSD 912.125.
4 Obstacles shall not protrude more than 50mm above the finished grade.
5 Drive 16D double head nail through post and offset block.
6 Mounting height to top of steel beam rail shall be measured vertically at face of rail.
7 Slope shall be flatter when specified.
8 Wooden offset block dressed dimensions shall be 140mm wide x 360mm long x 305mm deep.
9 The centre of the top hole shall be in line with the ground surface.
10 Wooden posts dressed dimensions shall be 140mm wide x 1829mm long x 184mm deep.
A System configuration meets AASHTO MASH TL–3.
B All dimensions are in millimetres unless otherwise shown.



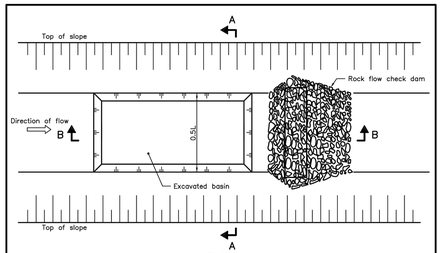
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2024	Rev 1
GUIDE RAIL SYSTEM, STEEL BEAM TYPE M – 5.715m LONG SPAN TREATMENT INSTALLATION		
	OPSD 912.246	



NOTES:
1 This OPSD shows right shoulder installation. The MASH SoftStop Terminal shall be inverted for left shoulder installation.
2 The system length shall be installed in a straight line at a 50:1 flare rate or parallel to roadway when specified.
3 Type M SBGR includes Type M20 and Type M30.
4 This OPSD shows right shoulder approach end installation with rail element splices lapped in direction of traffic. For leaving end installations, rail elements splices shall be lapped in direction of traffic.
A Delineation shall be according to OPSD 984.201 and 984.202.
B The system depicted here is a proprietary product.
C System configuration meets AASHTO MASH TL–3.
D This OPSD shall be read in conjunction with OPSD 202.031 or 202.032 as specified.
E All dimensions are in millimetres unless otherwise shown.

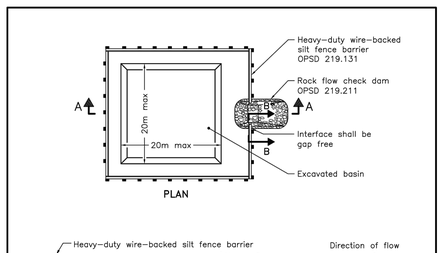
Table 1	
Steel Yielding Terminal Post	
Post	Length (m)
1	1.46
2	1.83

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2022	Rev 2
ENERGY ATTENUATOR, END TREATMENT STEEL BEAM ENERGY ATTENUATING TERMINAL MASH SOFTSTOP TERMINAL SYSTEM INSTALLATION		
	OPSD 922.165	



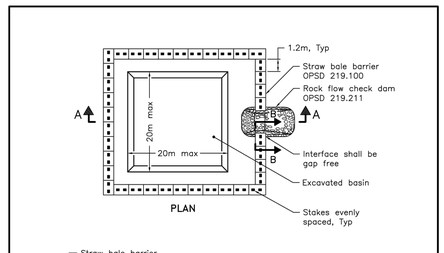
NOTES:
A Ditch cross–section upstream or downstream of sediment trap may be flat bottom or V–shaped. Flat bottom shown.
B This OPSD shall be read in conjuction with OPSD 219.210 or 219.211.
C All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
SEDIMENT TRAP IN DITCH		
	OPSD 219.220	



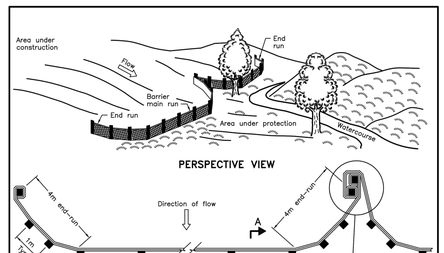
NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Apr 2024	Rev 3
SEDIMENT TRAP FOR DEWATERING WITH SILT FENCE		
	OPSD 219.240	



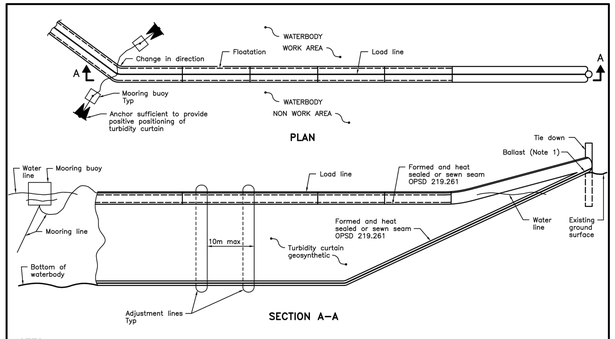
NOTE:
A Stake is 600mm below ground.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Apr 2024	Rev 0
SEDIMENT TRAP FOR DEWATERING WITH STRAW BALES		
	OPSD 219.241	



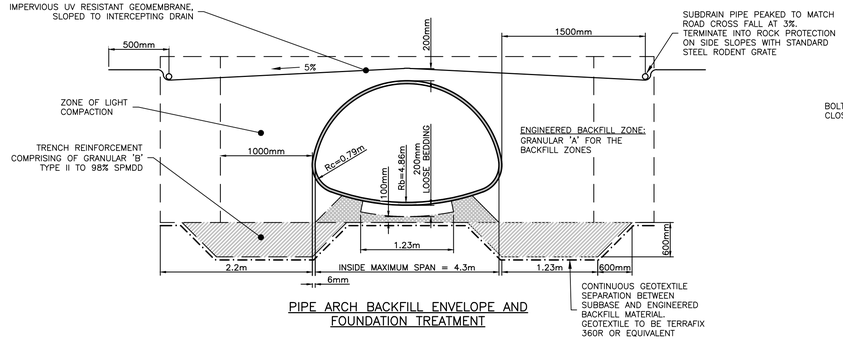
NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev 3
HEAVY–DUTY SILT FENCE BARRIER		
	OPSD 219.130	

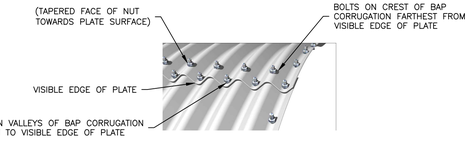


NOTES:
1 Additional ballast may be required depending on local conditions.
A All dimensions are in millimeters unless otherwise shown.

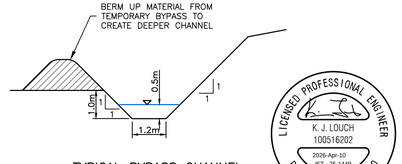
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2022	Rev 3
TURBIDITY CURTAIN		
	OPSD 219.260	



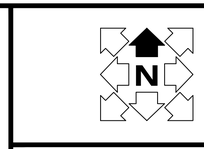
PIPE ARCH BACKFILL ENVELOPE AND FOUNDATION TREATMENT



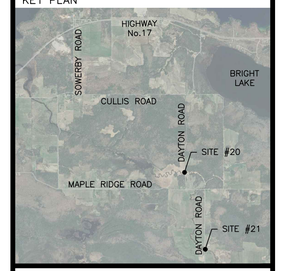
BOLT–A–PLATE ASSEMBLY LAP DETAIL



TYPICAL BYPASS CHANNEL



KEY PLAN



ENGINEER'S SEAL:

LICENSED PROFESSIONAL ENGINEER
April 10/26
M. D. KIRBY
100173482
PROVINCE OF ONTARIO
IFT – 25-1449

DATE	REV.	REVISION	BY	APP'D
26/04/10	0	ISSUED FOR TENDER	JTS	MK

CLIENT:

MUNICIPALITY OF HURON SHORES

CONSULTANT:

TULLOCH

PROJECT TITLE:

DAYTON ROAD / PICKEREL CREEK CULVERT #20 & #21 REPLACEMENT

DRAWING TITLE:

TYPICAL DETAILS

DRAWN	DESIGNED	CHECKED	APPROVED
JTS	MK	KL	MK

SCALE	DATE
AS NOTED	APR. 10, 2026

PROJECT No.	REVISION	DRAWING
251449	0	G2

K. J. LOUCH
100516202
2026-Apr-10
IFT - 25-1449
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

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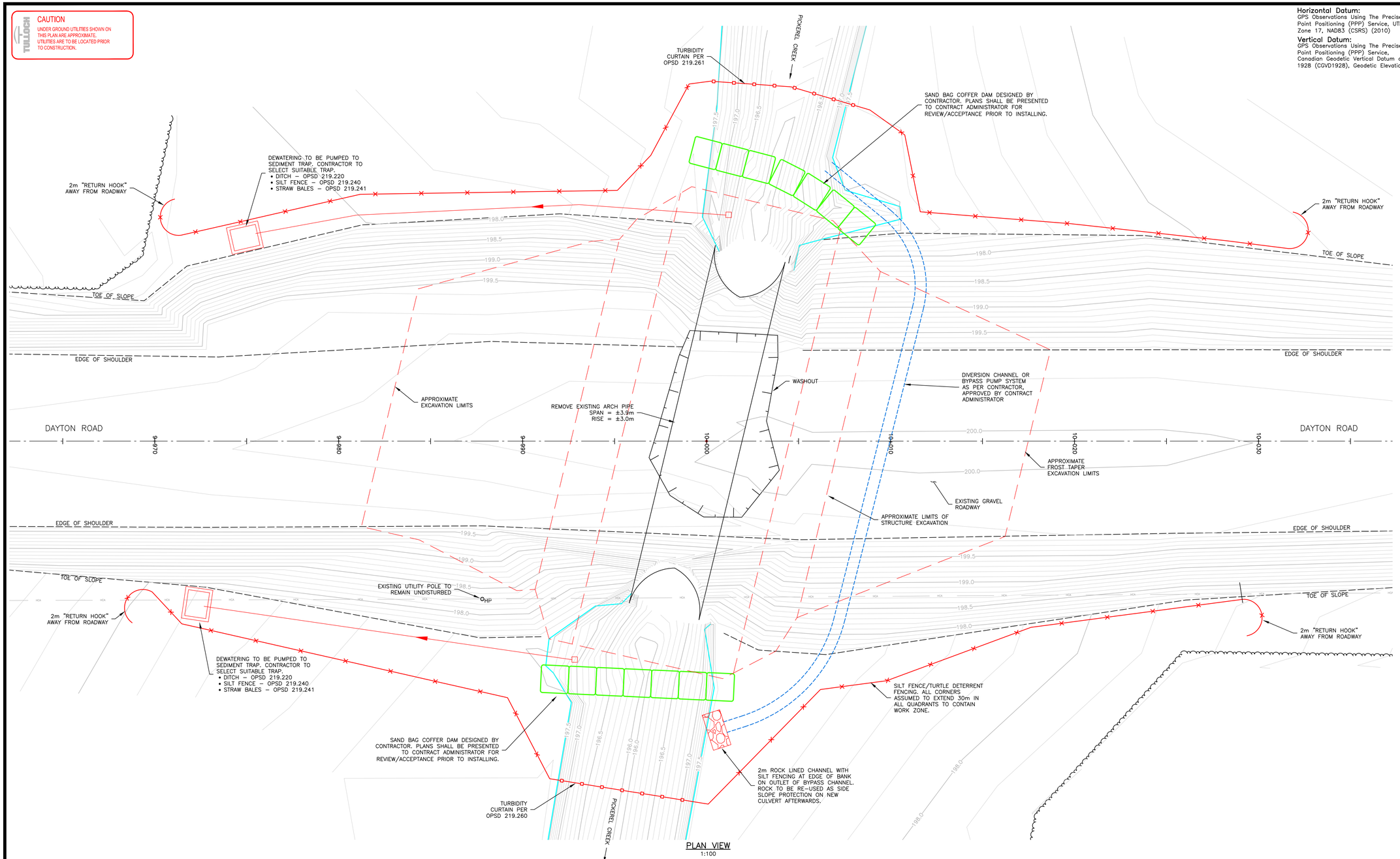
CAUTION

UNDER GROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. UTILITIES ARE TO BE LOCATED PRIOR TO CONSTRUCTION.

Horizontal Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, UTM Zone 17, NAD83 (CSRS) (2010)

Vertical Datum:
GPS Observations Using The Precise Point Positioning (PPP) Service, Canadian Geodetic Vertical Datum of 1928 (CGVD1928), Geodetic Elevations



PLAN VIEW
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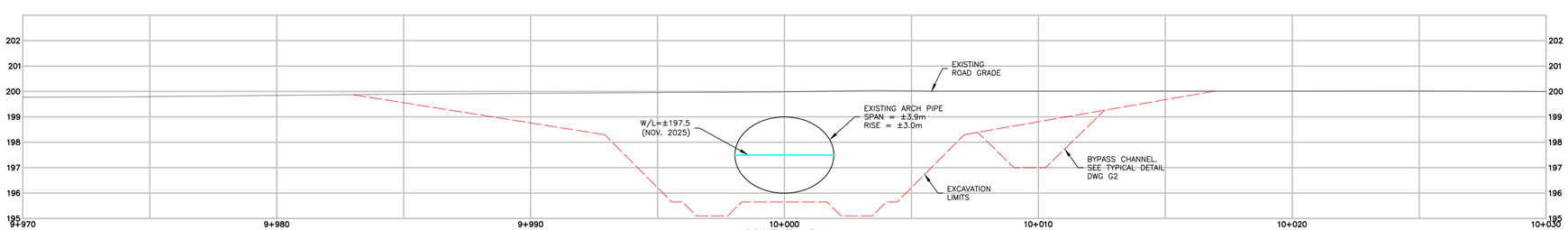

PROFILE VIEW
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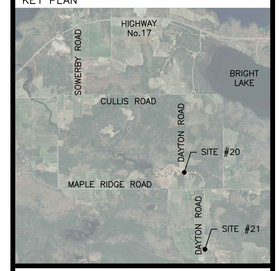
KEY PLAN



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PROVINCE OF ONTARIO
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DATE	REV.	REVISION	BY	APP'D
26/04/10	0	ISSUED FOR TENDER	JTS	MK

CLIENT: MUNICIPALITY OF HURON SHORES

CONSULTANT: TULLOCH

PROJECT TITLE:

DAYTON ROAD / PICKEREL CREEK CULVERT #20 & #21 REPLACEMENT

DRAWING TITLE:

EXISTING SITE PLAN / ENVIRONMENTAL & DEWATERING SEDIMENT CONTROL SITE #20

DRAWN	DESIGNED	CHECKED	APPROVED
JTS	MK	KL	MK

SCALE	DATE
1:100	APR. 10, 2026

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PROJECT No.	REVISION	DRAWING
251449	0	C1

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CAUTION
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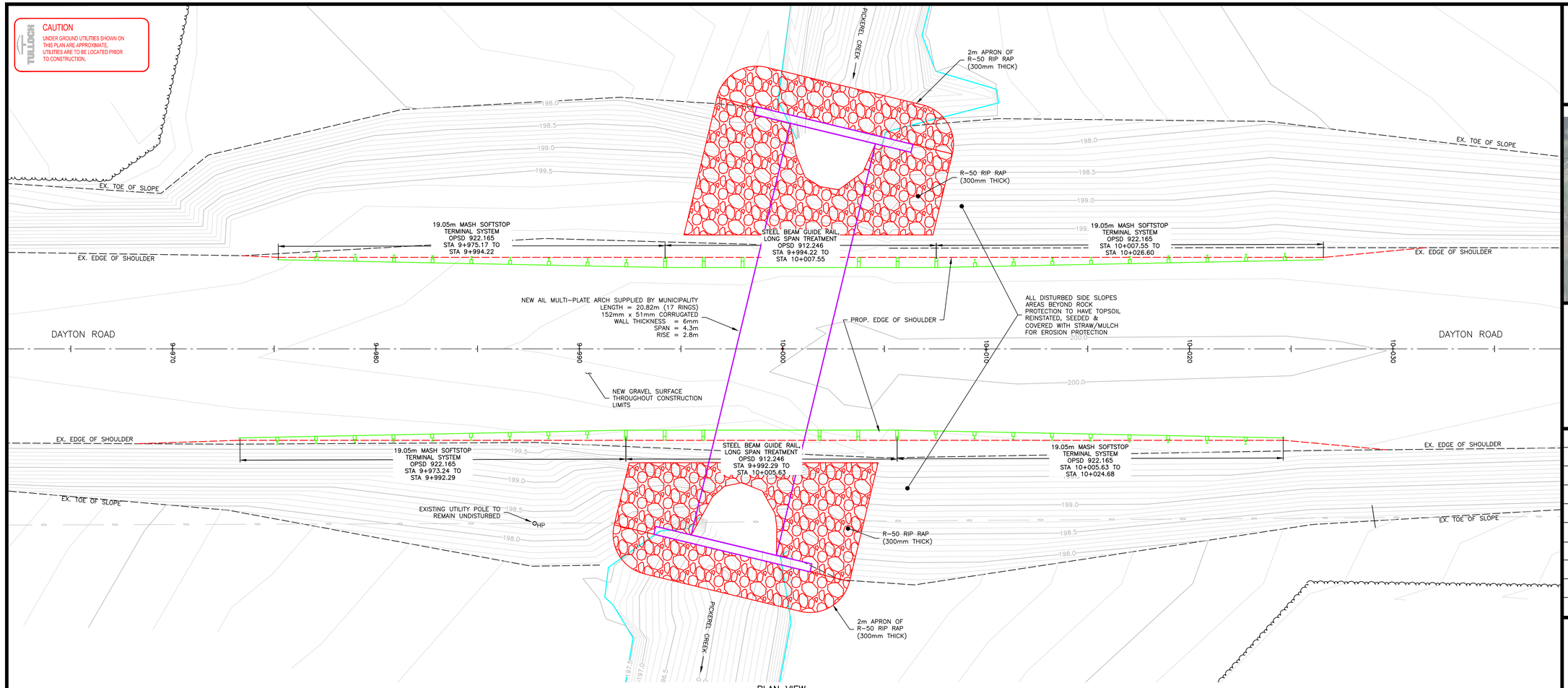

PLAN VIEW
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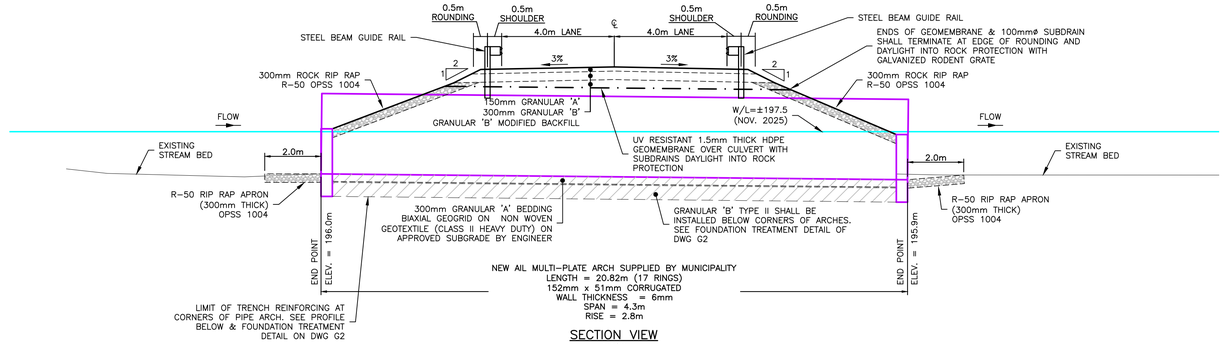

SECTION VIEW
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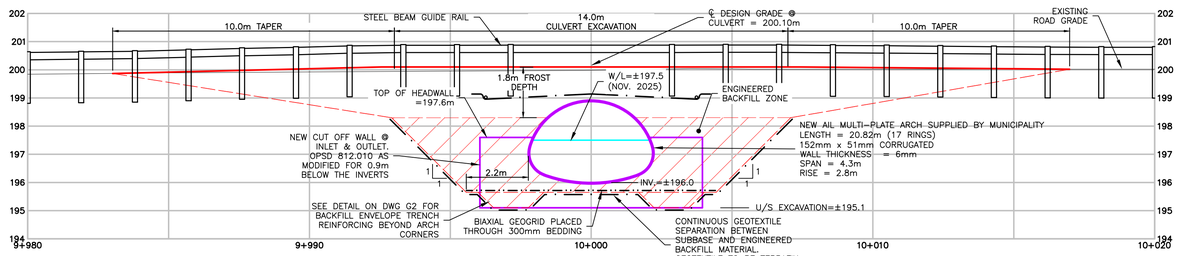

PROFILE VIEW
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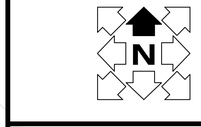

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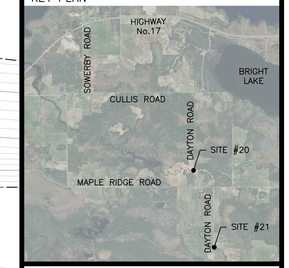

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M. D. KIRBY
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PROVINCE OF ONTARIO
IFT - 25-1449

DATE	REV.	REVISION	BY	APP'D
26/04/10	0	ISSUED FOR TENDER	JTS	MK

CLIENT:
MUNICIPALITY OF HURON SHORES

CONSULTANT:
TULLOCH

PROJECT TITLE:
DAYTON ROAD / PICKEREL CREEK CULVERT #20 & #21 REPLACEMENT

DRAWING TITLE:
PROPOSED CULVERT GENERAL ARRANGEMENT PLAN & DETAILS SITE #20

DRAWN	DESIGNED	CHECKED	APPROVED
JTS	MK	KL	MK

SCALE	DATE
AS NOTED	APR. 10, 2026

PROJECT No.	REVISION	DRAWING
251449	0	C2

LICENCED PROFESSIONAL ENGINEER
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2026-Apr-10
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PROVINCE OF ONTARIO

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CAUTION

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Horizontal Datum:
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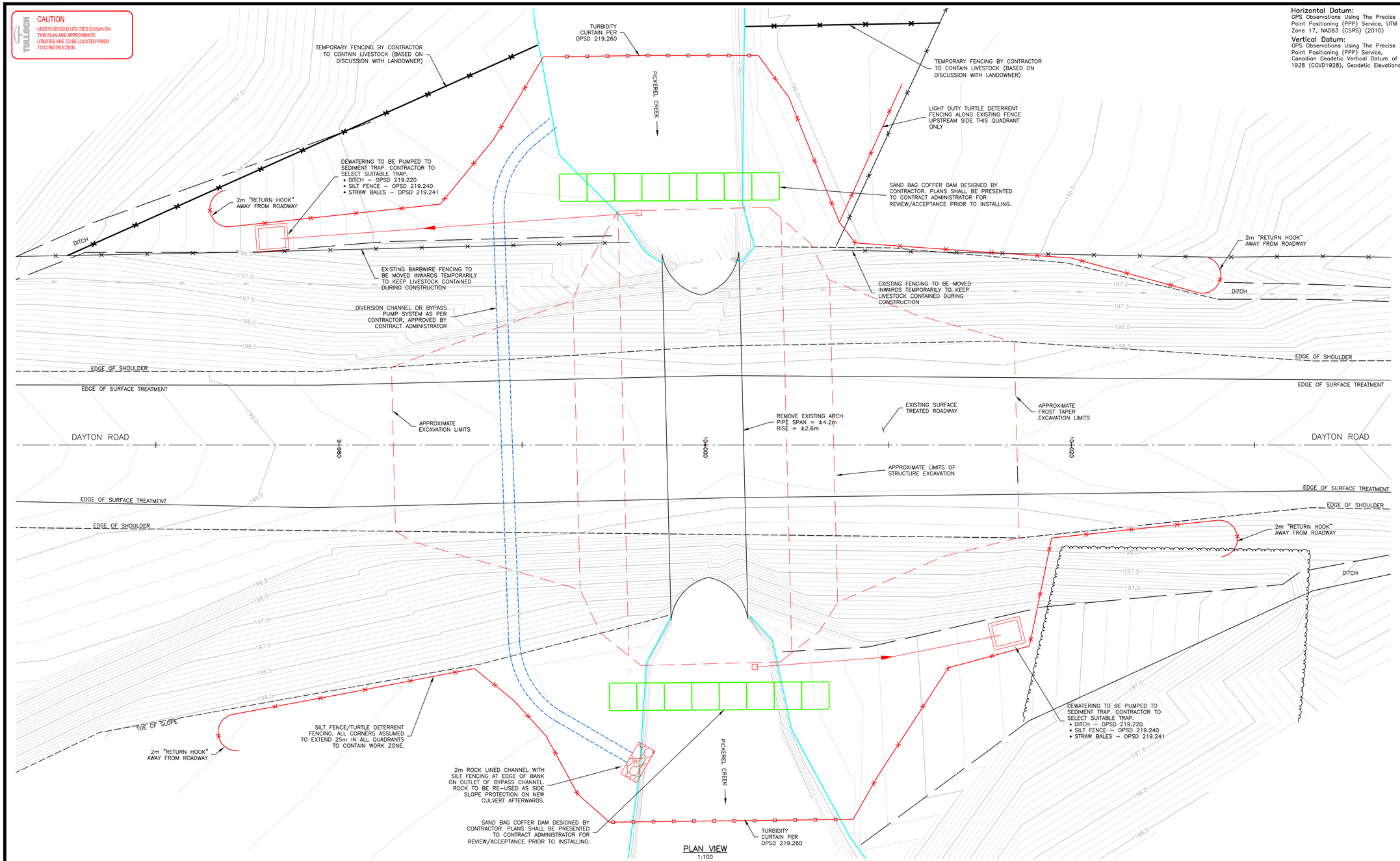

PLAN VIEW
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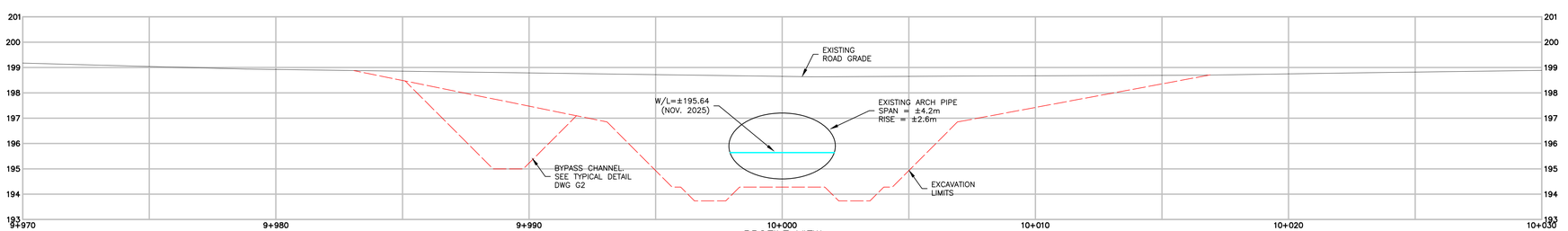

PROFILE VIEW
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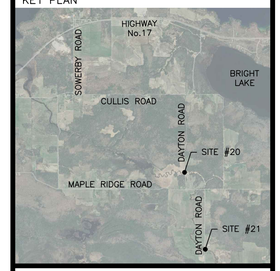
KEY PLAN



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LICENSED PROFESSIONAL ENGINEER
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M. D. KIRBY
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PROVINCE OF ONTARIO
IFT – 25-1449

DATE	REV.	REVISION	BY	APP'D
26/04/10	0	ISSUED FOR TENDER	JTS	MK

CLIENT:
MUNICIPALITY OF HURON SHORES

CONSULTANT:
TULLOCH

PROJECT TITLE:
DAYTON ROAD / PICKEREL CREEK CULVERT #20 & #21 REPLACEMENT

DRAWING TITLE:
EXISTING SITE PLAN / ENVIRONMENTAL & DEWATERING SEDIMENT CONTROL SITE #21

DRAWN	DESIGNED	CHECKED	APPROVED
JTS	MK	KL	MK

SCALE	DATE
1:100	APR. 10, 2026

PROJECT No.	REVISION	DRAWING
251449	0	C3

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2026-Apr-10
IFT - 25-1449
PROVINCE OF ONTARIO

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CAUTION
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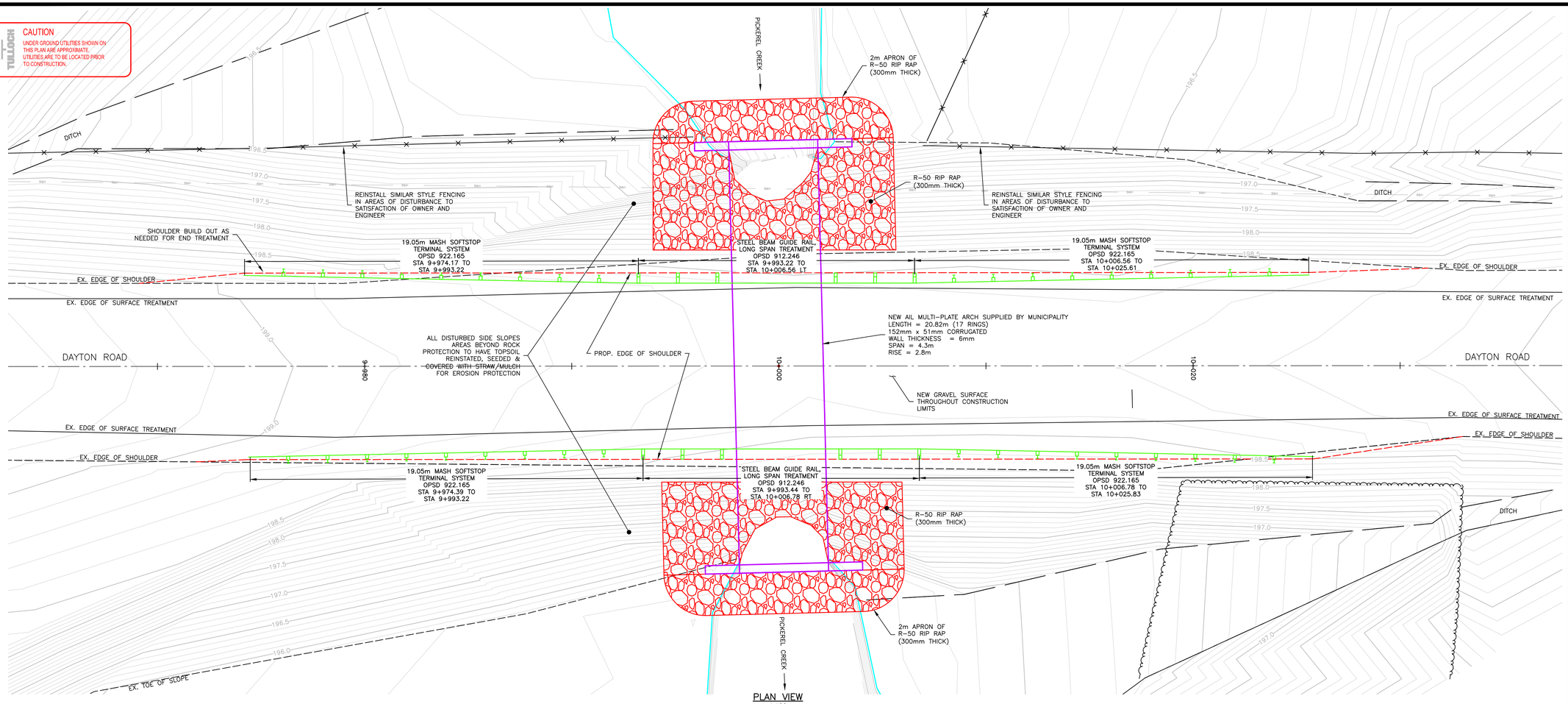

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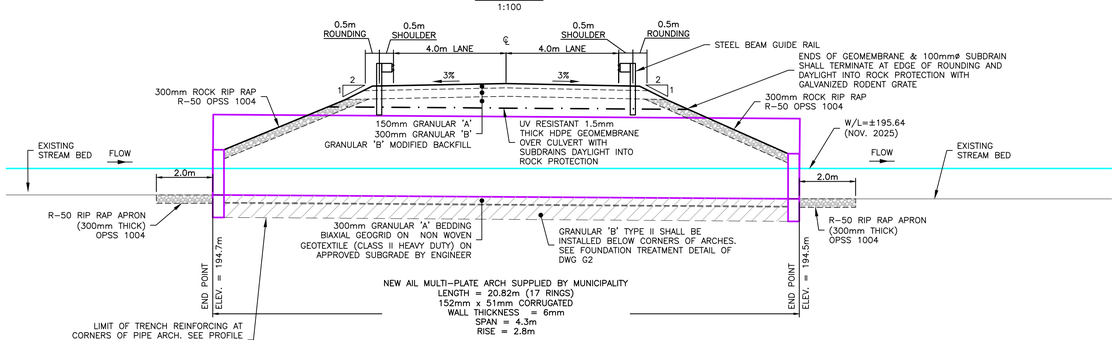

SECTION VIEW
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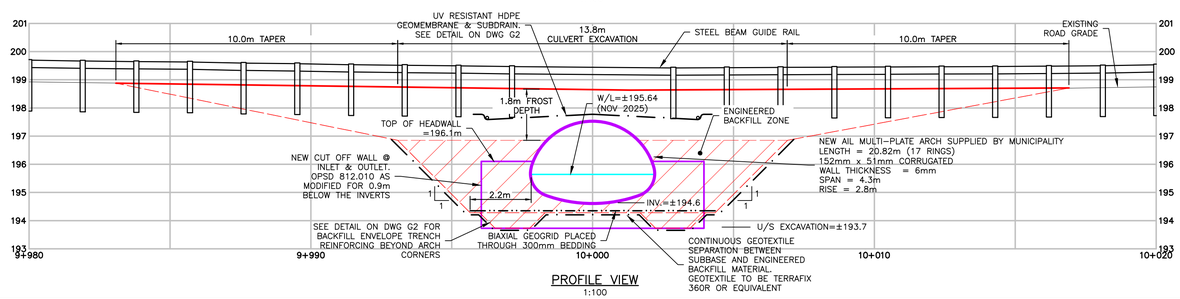

PROFILE VIEW
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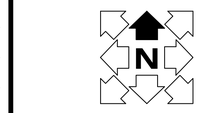
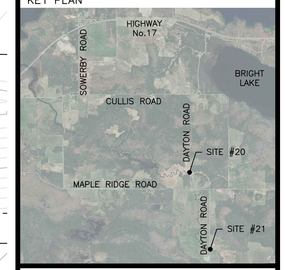


KEY PLAN



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April 10/26
M. D. KIRBY
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PROVINCE OF ONTARIO
IFT-25-1449

26/04/10	0	ISSUED FOR TENDER	JTS	MK
DATE	REV.	REVISION	BY	APP'D

CLIENT:
MUNICIPALITY OF HURON SHORES

CONSULTANT:
TULLOCH

PROJECT TITLE:
DAYTON ROAD / PICKEREL CREEK CULVERT #20 & #21 REPLACEMENT

DRAWING TITLE:
PROPOSED CULVERT GENERAL ARRANGEMENT PLAN & DETAILS SITE #21

JTS	MK	KL	MK
DRAWN	DESIGNED	CHECKED	APPROVED

AS NOTED	APR. 10, 2026
SCALE	DATE

251449	0	C4
PROJECT No.	REVISION	DRAWING

LICENSED PROFESSIONAL ENGINEER
K. J. LOUCH
100516202
2026-Apr-10
IFT - 25-1449
PROVINCE OF ONTARIO

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