Request for Quote

For

Upper Arden Dam Rock Anchor Installation

In the Township of Central Frontenac

Requested by Quinte Conservation Authority
July 2nd, 2025

RFP Contact:
msmith@quinteconservation.ca

Closing:
Tuesday, August 5th, 2025 at 2pm

Quinte Conservation
RR#2
2061 Old Highway 2
Belleville, ON
K8N 4Z2

Background & Scope of Work

The Upper Arden dam is a concrete gravity structure with integral concrete spillway and overflow sections. The dam is in fair condition with some map cracking.

In March 2024, a Dam Safety Review identified a stability issue and thus recommended the installation of rock anchors. In March 2025, Gram Engineering complete a design for the rock anchors for Upper and Lower Arden Dam. Only Upper Arden dam is being completed under this project.

Upon award contractor is to provide Insurance and WSIB. Prior to mobilizing a Form 1000 must be submitted.

Access to this dam is located on private property at 6076A Arden Rd in Arden, Ont. The dam shall be accessed via the right of way' as shown on the attached map. The 'right of way' has been marked on site by an OLS. Some site work is required to prepare the site for work. The attached map outlines the work to be completed. If any additional site work is required, the proposal must detail such work. The construction area is to be properly delineated and made safe as this is a highly public area. Special care must be taken to minimize the laydown area and any disturbance to the local area. Any construction and remediation plans will be reviewed with the property owners. Any damage that occurs because of this project will be repaired to the satisfaction of the property owners as a final sign-off of approval will be required of the property owners.

An in-water works permit has not been initiated and is not expected for this project. Any work must be completed from a floating platform, directly from land or on the dam itself. The handrails and gantry can be removed if required but must be placed back in similar or better state.

The typical summer water levels on Big Clear Lake are held between 196.46 and 196.6. After thanksgiving the water levels are lowered to the winter levels of 196.38 to 196.6. Water depths in the head pond directly in front of the sluiceway ranges from 3-4' while the water depth at the shore is only inches. Water can breach the dam deck during the freshet.

Quinte Conservation has begun the permit required under the LRIA for dam alterations. The contractor is to provide work plans and information as required by the MNR. The contractor is to submit a sediment and erosion plan, construction plans, site plan, product data and any other pertinent information for approval to Quinte Conservation and MNR. Any additional environmental permits, if required based on the method of installation, are to be applied for and paid for by the contractor. The schedule must account for the permit application and approval.

The contractor is to provide red-line as-builts showing exact locations and depths following installation.

Provide a PROVISIONAL PRICE to inject grout into the crack larger than 5mm on the right section of the dam.

Provide a PROVISIONAL PRICE to design and install metal stairs from the right crest of the dam to the top of the embankment. Design to meet OBC and stamped by a P.Eng.

Known Reports or Data

- Design Report for Upper and Lower Arden Dams – Rock Anchor Tiedowns (Gram Engineering Ltd., 2025)
- Permanent Tiedowns Notes, Plan, Section, Elevation, Detail & Schedule - Drawing TD1 (Gram Engineering Ltd., 2025)

Meetings and Site Visits

Upon award, a start-up meeting will be required to confirm the methodology, schedule, etc.

The contractor will be responsible for preparing agendas and recording minutes of all meetings and distributing to QC in a timely fashion.

Provide 1 week notice for any site visits to notify any affected parties.

Proposal Submission Requirements

The proposal shall be submitted no later than the date and time below. Copies of the proposals shall be sent to Mike Smith at msmith@quinteconservation.ca.
The proposal shall include:

- Details on the approach and methodology including materials, equipment and sediment/erosion controls (if required).
- Contact person and phone number and people involved in the preparation of the proposal
- Gantt chart schedule showing any critical activities prior to arriving on site and all construction activities
- sub-consultants to be used and their role
- Complete construction methodology. Clearly show any assumptions made or requirements from Quinte Conservation.
- attestation of all addenda reviewed
- state all assumptions used
- project budget and cost breakdown

Proposals shall not exceed 8 pages in length.

Mandatory Site Visit	Tuesday, July 22nd, 2025 at 930am
Questions regarding the proposal due	Tuesday, July 29th, 2025 at 930am
RfP addenda posted on the Quinte Conservation website	Thursday, July 24, 2025
Request for proposal closing	Tuesday, August 5th, 2025 at 2pm

Selection Criteria

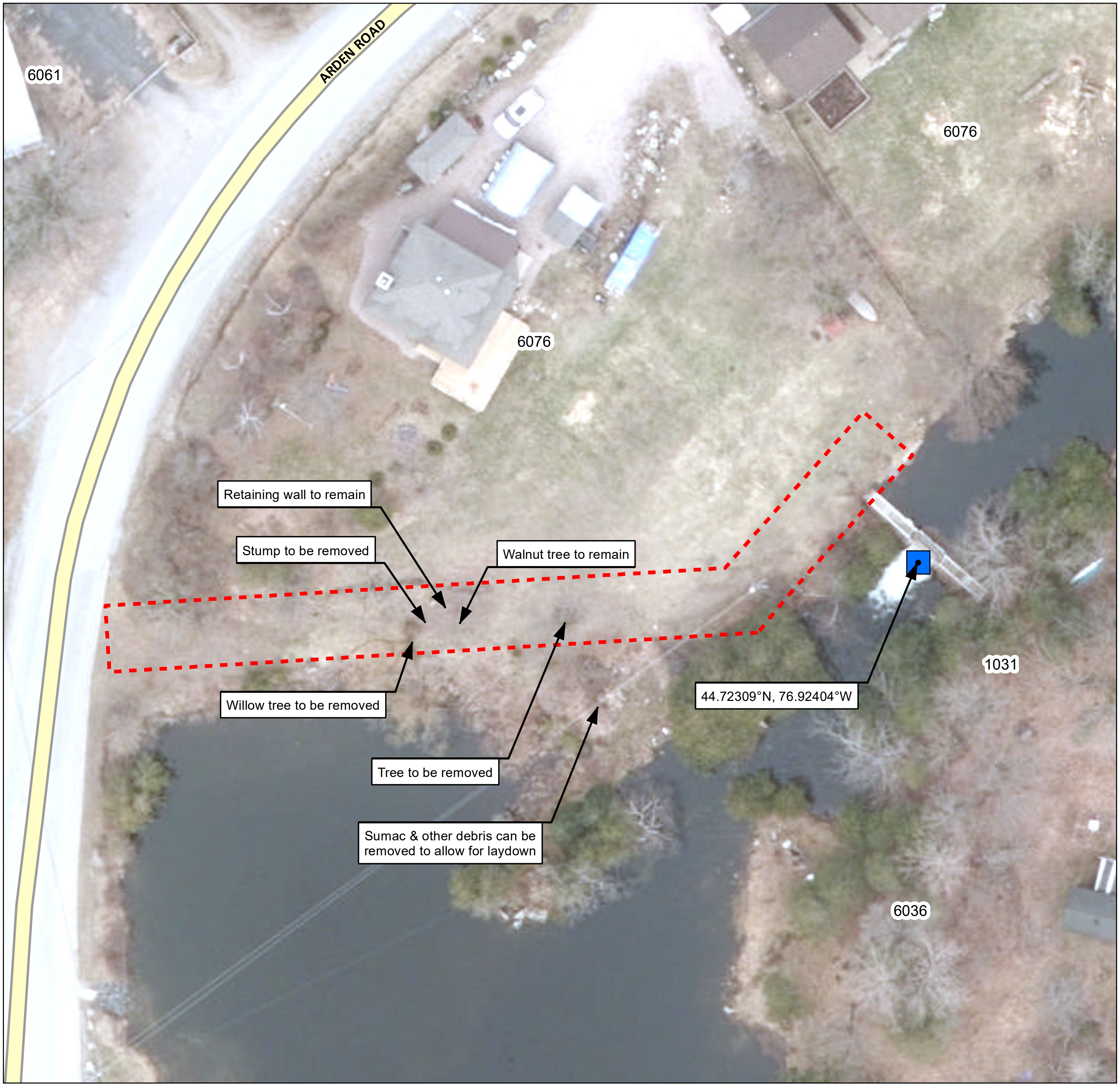
QC will select the successful contractor following an assessment of the submitted proposals based on criteria such as meeting the project requirements, project team experience, project schedule and project cost. The proposal with the lowest bid may not necessarily be accepted.

It is anticipated that the successful consultant will be notified at the latest by the end of Aug, 2025. This project is subject to confirmation of funding and Quinte Conservation reserves the right to reject any or all proposals and cancel the project. This RFP is not a tender.

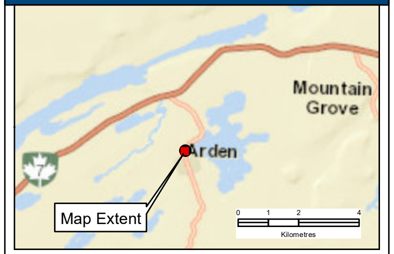
Appendix A: Photos of Dam

Figure 1: Upstream Side of Dam, Looking From Right Embankment, 2024

Figure 2: Looking at Downstream side of dam. 2013 (handrails have since been upgraded).

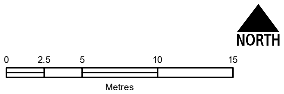


KEY MAP



LEGEND / NOTES

- 🟦 Upper Arden Dam
- ▭ Right of Way (20' wide)



No.	REVISION	DD/MM/YY
03	R.O.W. correction	26/06/25
02	Landowner edits	18/06/25
01	Rock anchor site prep.	17/06/25
00	Draft for comment / review	05/05/25

Quinte CONSERVATION

Moira River, Napanee Region and Prince Edward Region Watersheds.
RR # 2, 2061 Old Highway # 2, Belleville, Ontario, K8N 4Z2.
www.quinteconservation.ca, 613-968-3434

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Digital Mapping Sources:
Base Map - Ontario Ministry of Natural Resources
Imagery - 2008 Copyright © of Aéro-Photo (1961) Inc.
– All Rights Reserved
Imagery - DRAPE 2024 Ontario Ministry of Natural Resources
Key Map - ArcGIS Online Services

DEPARTMENT:
Water Resources

TITLE:
Upper Arden Dam Site Plan

SCALE: 1:500
SHEET: 1 of 1
DRAWING: C.D.
CHECK: M.S.

Original Document: 8.5 x 11 in

Path: E:\Projects\WR\Dams\UpperArdenDam\UpperArdenDamSitePlanR03.mxd

DRAWING NOTES:

A. SCOPE:

1. This set of drawings depicts permanent rock anchor tiedowns to support the Upper Arden Dam project located at Arden Mill Pond in Central Frontenac, Ontario.

B. REFERENCES - DRAWINGS, REPORTS, BUILDING CODES, & STANDARDS:

1. Design Report for Rock Anchor Tiedowns by GRAM Engineering Ltd. dated February 28, 2025.
2. Upper Arden Dam Safety Review and Public Safety Risk Assessment Document by KGS Group dated March 26, 2024.
3. Tiedown design and loading conform with components of:
   a. Ontario Building Code 2012;
   b. Micropile Design and Construction Manual, FHWA NH1-05-039, US Department of Transportation and US Federal Highway Administration; and
   c. Canadian Foundation Engineering Manual, 4th Edition.
3. All structural steel design, materials, connections, fabrication, and erection is to conform to requirements of:
   a. CSA S16:14 Design of Steel Structure;
   b. CSA S136:16 North American Specification for the Design of Cold-Formed Steel Structural Members;
   c. CSA G40.20:13/G40.21:13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel; and
   d. CSA W59:13 Welded Steel Construction (Metal Arc Welding).
4. Fabrication, grouting, and testing of tiedowns:
   a. Micropile Design and Construction Manual, FHWA NH1-05-039, US Department of Transportation and US Federal Highway Administration, 2005;
   b. ASTM A722/A722M-18 Standard Specification for High-Strength Steel Bars for Prestressed Concrete;
   c. CSA G30.18:21 Carbon Steel Bars for Concrete Reinforcement;
   d. ASTM D-3689-07 Standard Test Method for Deep Foundations Under Static Axial Tensile Load - Cyclic Loading Test;
   e. PTI M55.1-12 Specification for Grouting of Post-Tensioned Structures; and
   f. PTI DC35.1-14 Recommendations for Prestressed Rock and Soil Anchors.

C. DESIGN PARAMETERS & ASSUMPTIONS:

1. Tiedowns have been designed for tension loading as required to meet the minimum factor of safety of 1.5 for sliding based on the initial analysis in KGS' Report (References Note B.1).
2. Tiedowns are designed for permanent conditions with a limited design life of 100 years.
3. Tiedowns are designed for double corrosion protection in accordance with manufacturer's recommendations.
4. Gravity grouted tiedown adhesion assumed to be 400 kPa. Tiedown performance and adhesion(s) to be verified by Foundation Contractor and one performance test to 200% of design assumption in consultation with Geostructural Engineer.
5. Existing structures adjacent to excavation are assumed to be in sound structural condition and in compliance with the Ontario Building Code 2012.
6. All permits, approvals, and construction agreements including encroachments to be secured by Owner or their representative prior to construction.

D. CONSTRUCTION TOLERANCES AND RESTRICTIONS:

1. Foundation Contractor to utilize appropriate means and methods to meet specified tolerances for layout and verticality including:
   a. Tiedowns to be installed to be within 75 mm in any direction; and
   b. Tiedown verticality to be plumb within 1% of the drilled length in all directions.

   Should any deviation occur or be suspected from specified layout or verticality occur, promptly notify Construction Manager and Geostructural Engineer to determine if remedial measures are required.
2. During grouting of tiedowns, if excessive grout volumes are observed exceeding 10% of theoretical volumes, Foundation Contractor to stop work and notify Construction Manager and Geostructural Engineer.
3. Verification of tiedown adhesion(s) to be completed prior to production tiedown installations unless otherwise agreed upon between Owner, Construction Manager, and Foundation Contractor.
4. All tiedown testing to be completed seven days after grouting unless otherwise agreed upon between Owner, Construction Manager, and Foundation Contractor.
5. Tiedown bars and casing are to be trimmed using quick-cut saws. Do not use open flame torches.
6. Accuracy and repeatability of all monitoring readings to be ±2 mm or better.

E. MATERIALS:

1. Alternative materials, sections, or grades of equivalent strength may be substituted subject to review and approval by Geostructural Engineer.
2. Tiedowns to be fabricated using:
   a. Solid threadbar by DYWIDAG or equivalent to be #14 Bar: A_s = 1452 mm^2, P_y = 801 kN, and f_y = 550 MPa;
   b. All hardware including nuts, couplers, etc. per Supplier's requirements;
   c. Centralizers to be polyvinyl chloride (PVC) or high-density polyethylene (HDPE), and installed at least every 1.5 m throughout the length of each tiedown; and
   d. Non-shrink cementitious grout with minimum strength of 30 MPa in 28 days. Foundation Contractor to provide grout mix design to Geostructural Engineer for review.
3. Hardware and Class 1 Corrosion Protection (Double Corrosion) to be as per DYWIDAG or equivalent supplier.
4. All structural steel shall be new material with:
   a. Grade 350W for wide flanges, hollow sections, and channels; and
   b. Grade 300W for plates, angles, and other steel members.
5. All structural steel to be hot dipped galvanized to minimum 600 g/m^2 zinc. Assemble fabrications prior to galvanizing.
6. All field cuts and welds to be cleaned and painted with two coats of zinc-rich paint, Galvafroid or equivalent.
7. Welding to be in accordance with CSA W59 and be performed by certified welders.

F. SAFETY:

1. All work is to be completed in accordance with the latest Occupational Health and Safety Act (OHSA).
2. Guardrails or equivalent to be installed all-around dam in accordance with OHSA.
3. Ensure adequate environmental containment of drilling fluids, spoils, and grout during installation to not contaminate water stream. If contamination occurs, immediately notify Owner. Foundation Contractor to provide environmental procedure for review by Owner.
4. Foundation Contractor to provide adequate water rescue plan for upstream and downstream conditions for review by Owner.

G. CONSTRUCTION MANAGER OR EQUIVALENT REQUIREMENTS:

1. Supervise all work on site and ensure work is in general conformance with the Contract Documents. Promptly notify Geostructural Engineer of any discrepancies or deficiencies.
2. Utilities are schematically shown and are based on the above References - Drawings, Reports, Building Codes, & Standards Notes B. Prior to drilling, locate, identify, and confirm elevations of all underground and overhead utilities within the influence of the tiedown works. Provide records to Foundation Contractor and Geostructural Engineer.
   a. Promptly notify the Geostructural Engineer of any discrepancies or missing utilities that requires re-engineering of designs.
   b. Protect and/or relocate any conflicting utilities in accordance with Utility Owner's requirements.
3. Remove any underground obstructions conflicting with the tiedowns and backfill with engineered fill or lean mix concrete as approved by Geotechnical Engineer and Foundation Contractor.
4. Reduce or raise grades to top of drill platform as required by Foundation Contractor.
5. Provide tiedown layout and offset references as required by Foundation Contractor in all three dimensions. Check all dimensions and verify any conflicts with finalized Contract Documents. Promptly notify Geostructural Engineer of any discrepancies or inconsistencies.
6. Full-time on-site review and testing of tiedowns:
   a. Geostructural Engineer to be present full-time during all drilling, grouting, and testing activities.
   b. Foundation Contractor to provide mill certificates for threaded bars and plates.
   c. Foundation Contractor and/or Field Engineer to provide installation records for each tiedown.
   d. Foundation Contractor and/or Field Engineer to provide grout logs for each tiedown including grout take (in bags of cement) and grout density (specific gravity via mud balance at batch plant and return at top of core).
   e. Promptly provide all results and reports to Foundation Contractor, Geostructural Engineer, and any other parties as requested.
7. Verify tiedown placement and as-builts. Should tiedowns exceed tolerances noted in above Construction Tolerances and Restrictions Note D.1., promptly notify Foundation Contractor and Geostructural Engineer.
8. Ensure all water is redirected away from top of tiedowns to prevent grout contamination.
9. Immediately notify Geostructural Engineer of any damages to tiedowns such as cracking, bending, buckling, etc. Protect tiedowns from damage.
10. Ensure all voids are backfilled with appropriate material such as granular or unshrinkable fill.
11. Contact Geostructural Engineer for field work and site presence including tiedown installations, tiedown testing, etc. with minimum two business days notice.
12. Coordinate any unplanned excavation with Geostructural Engineer that is not explicitly shown on these drawings.

H. TIEDOWN PROCEDURES:

1. Foundation Contractor to submit a detailed work plan for review.
2. Foundation Contractor to complete and maintain utility locates prior to drilling. Notify Construction Manager and Geostructural Engineer of any discrepancies.
3. Installation of tiedowns including:
   a. Foundation Contractor to select tiedown drilling methods to maximize adhesions, prevent soil loss and grout communication between tiedowns, and avoid weakening or disturbing the soil mass. When drilling below water table, Foundation Contractor to use grout bags or equivalent to seal tiedown holes, as required, and use methods to prevent washout of grout.
   b. Foundation Contractor to conduct water pressure testing per PTI Manual DC35.1-14, Section 7.5.
      i. Foundation Contractor to fill drilled hole(s) with water, seal hole(s) with a packer or equivalent, and apply minimum pressure of 93 kPa (13.5 psi) or 35 kPa (5 psi) in excess of hydrostatic head for 10 minutes. If water loss within hole(s) exceeds 10.3 L (2.75 gal.), grout hole(s), re-drill next day, and complete water pressure testing again until water loss is below acceptable amount.
   c. Foundation Contractor to install centralizers at required spacing as noted.
   d. Foundation Contractor to grout each tiedown using tremie tube and continue grouting until clean, dense grout flows out of top of core.
   e. Foundation Contractor to ensure tiedown holes are fully filled and create an appropriate bond breaker for free lengths during testing of tiedowns.
   f. Foundation Contractor to install performance test tiedown per design requirements noted in above Design Parameters & Assumptions Note C.4 to verify twice design adhesion(s). Allow for additional bar capacity and provide load test frame accordingly for maximum test load(s). Geostructural Engineer to be present during installations and performance testing of tiedowns.
   g. Once tiedown adhesion(s) are verified, Foundation Contractor to install production tiedowns; adjust anchor lengths as required based on performance test results.
   h. Foundation Contractor to proof test tiedowns to 133% of design load.
   i. Maintain tiedown bars in good condition. Do not damage or bend tiedowns after installation and/or testing.
   j. Foundation Contractor to cutdown tiedowns as required by Construction Manager a minimum of two days after completion of drilling and grouting.
3. Foundation Contractor to dress tiedowns with nuts and plates per detail.

I. TESTING PROCEDURES:

1. Geostructural Engineer to be present during all tiedown testing.
2. Tension static performance load test to 200% of design adhesion in conformance with ASTM D-3689-07 and per following:
   a. 25% of design load (DL);
   b. 25% of DL, 50% of DL, and hold for 10 minutes;
   c. 25% of DL, 50% of DL, 75% of DL, and hold for 10 minutes;
   d. 25% of DL, 50% of DL, 75% of DL, 100% of DL, and hold for 10 minutes;
   e. 25% of DL, 50% of DL, 75% of DL, 100% of DL, 125% of DL, and hold for 10 minutes;
   f. 25% of DL, 50% of DL, 75% of DL, 100% of DL, 125% of DL, 150% of DL, and hold for 10 minutes;
   g. 25% of DL, 50% of DL, 75% of DL, 100% of DL, 125% of DL, 150% of DL, 175% of DL, and hold for 10 minutes;
   h. 25% of DL, 50% of DL, 75% of DL, 100% of DL, 125% of DL, 150% of DL, 175% of DL, 200% of design adhesion, and hold for 60 minutes; and
   i. 25% of DL.
3. Tension static proof load test all tiedowns to 133% of SLS design loads in conformance with ASTM D3689M-07 and per following:
   a. 25% of design load (DL), 50% of DL, 75% of DL, 100% of DL, 133% of DL, and hold for 10 minutes; and
   b. 25% of DL.
4. Acceptable creep rate is up to 1 mm per log cycle. If creep exceeds 1 mm per log cycle, hold load for a minimum of 60 minutes until creep rate is 2 mm or less per log cycle. If creep exceeds 2 mm per log cycle after 60 minutes, unload tiedown to alignment load, record final residual movement, and stop load test.

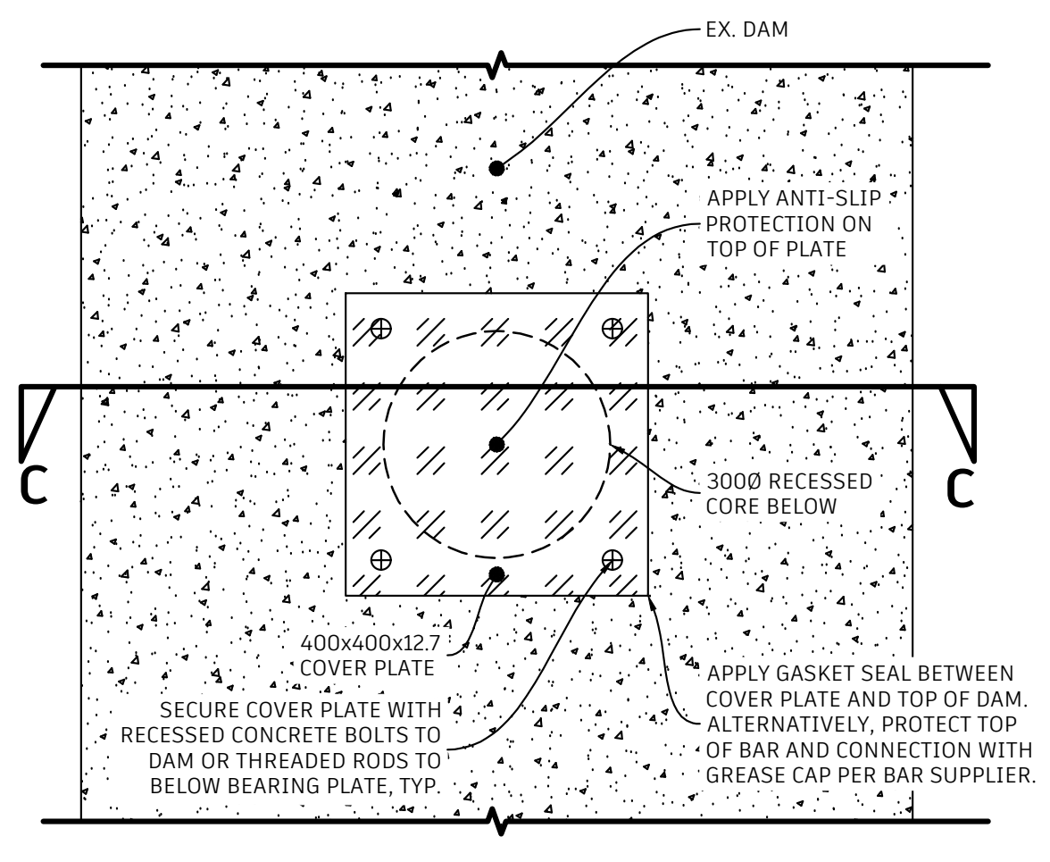
J. ROCK CONDITIONS:

1. Foundation Contractor to allow for variations in rock elevations where necessary to maintain minimum depth requirements of tiedowns. Promptly notify Geostructural Engineer where rock elevations vary by more than 0.5 m.

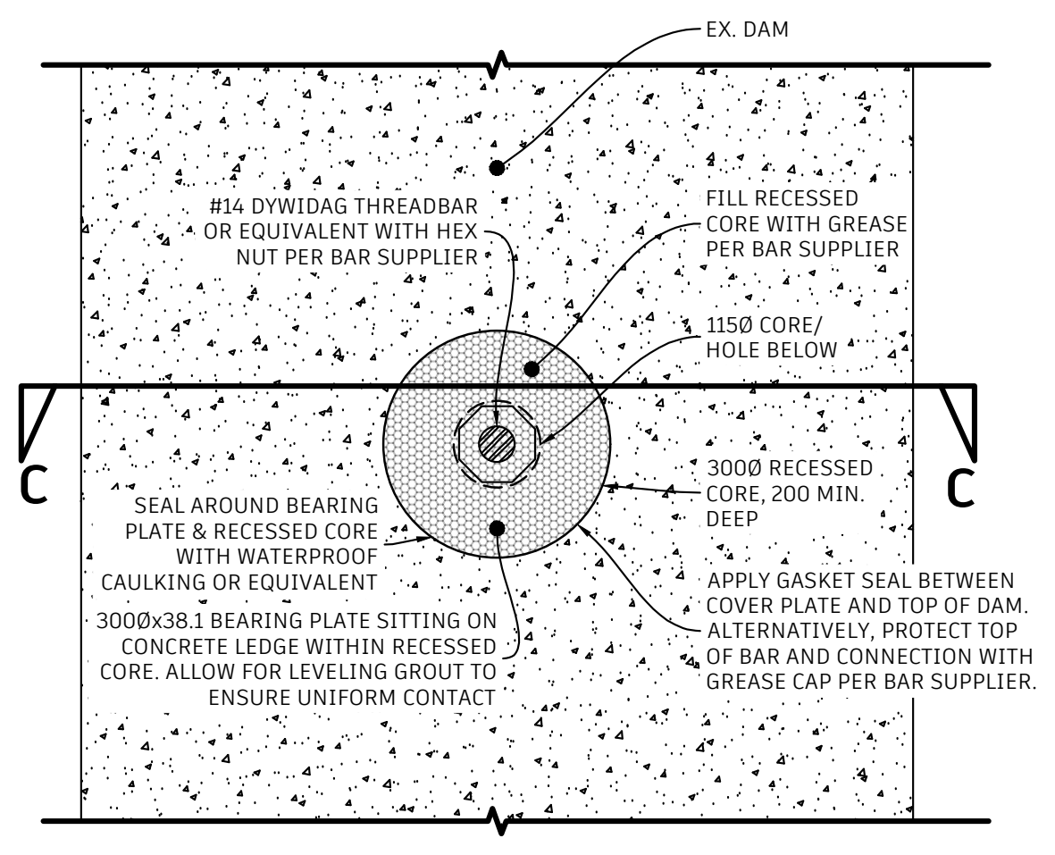
UPPER ARDEN DAM ANCHOR TIEDOWN SCHEDULE

TIEDOWN NO.	TOP OF DAM ELEVATION	U/S OF RECESSED CORE ELEVATION	SLS DESIGN LOAD	ULS DESIGN LOAD	BAR SIZE	DIAMETER	FREE LENGTH*	ANCHOR LENGTH*	TOTAL LENGTH*	QUANTITY	NOTES
UTD1 - UTD6	196.32 m	196.12 m	400 kN	600 kN	#14	115 mm	2.8 m±	3.0 m	5.8 m	6	DOUBLE CORROISON PROTECTION PER MANUFACTURER'S REQUIREMENTS

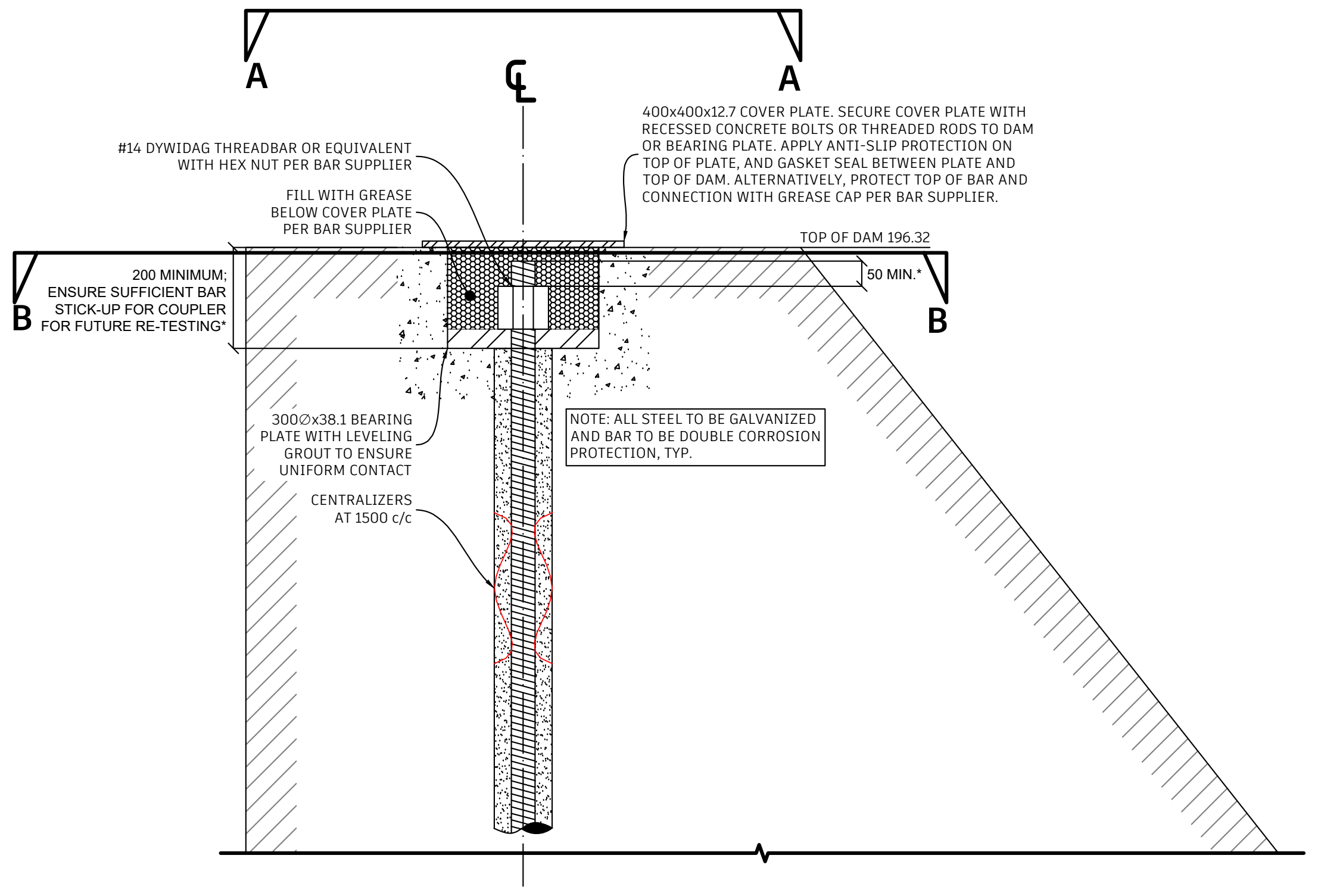
*FROM TOP OF DAM; ASSUMED 1 m WEATHERED ZONE FOR ROCK BELOW UNDERSIDE OF DAM; ANCHOR LENGTH TO BE IN SOUND ROCK.



PLAN A-A



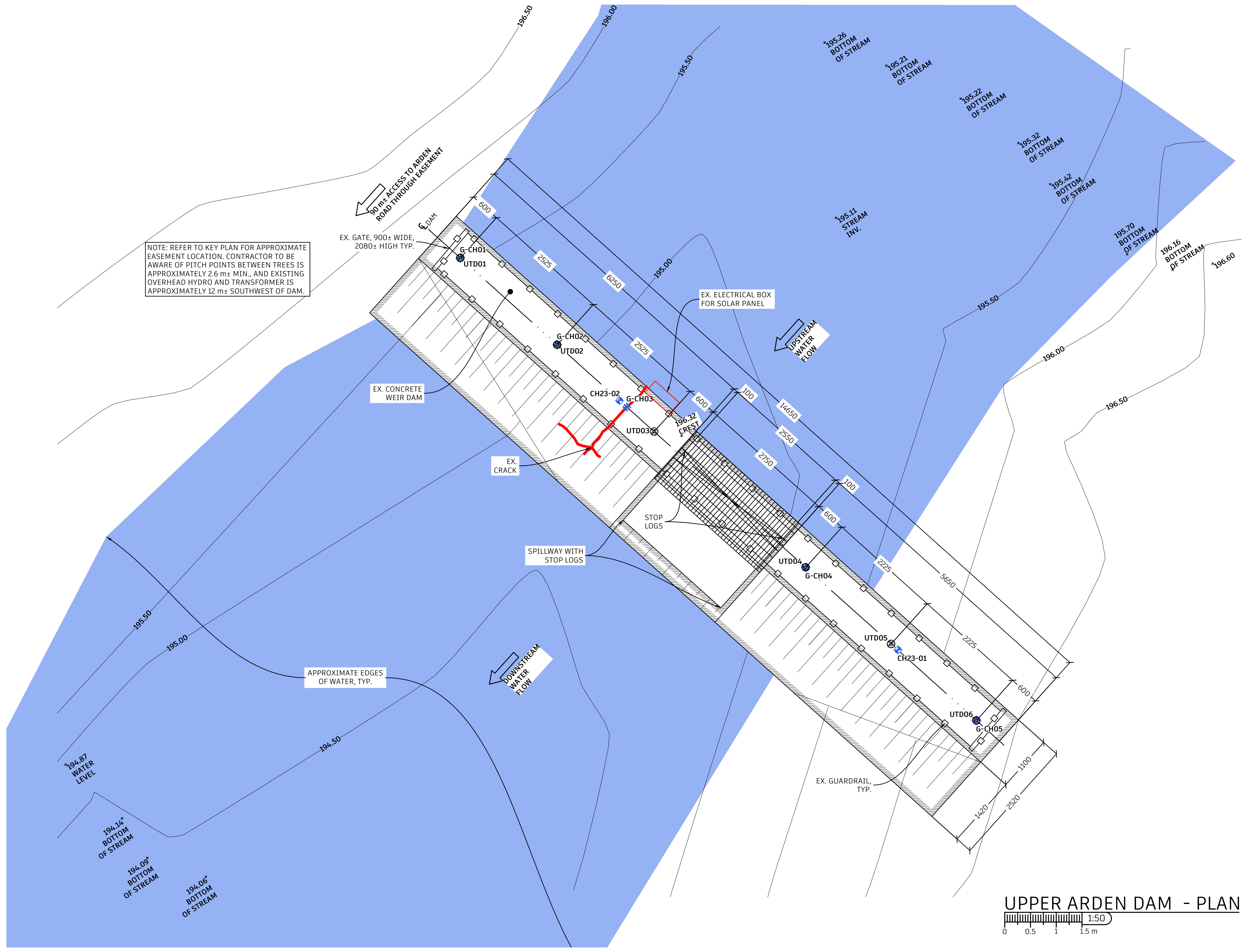
PLAN B-B



SECTION C-C

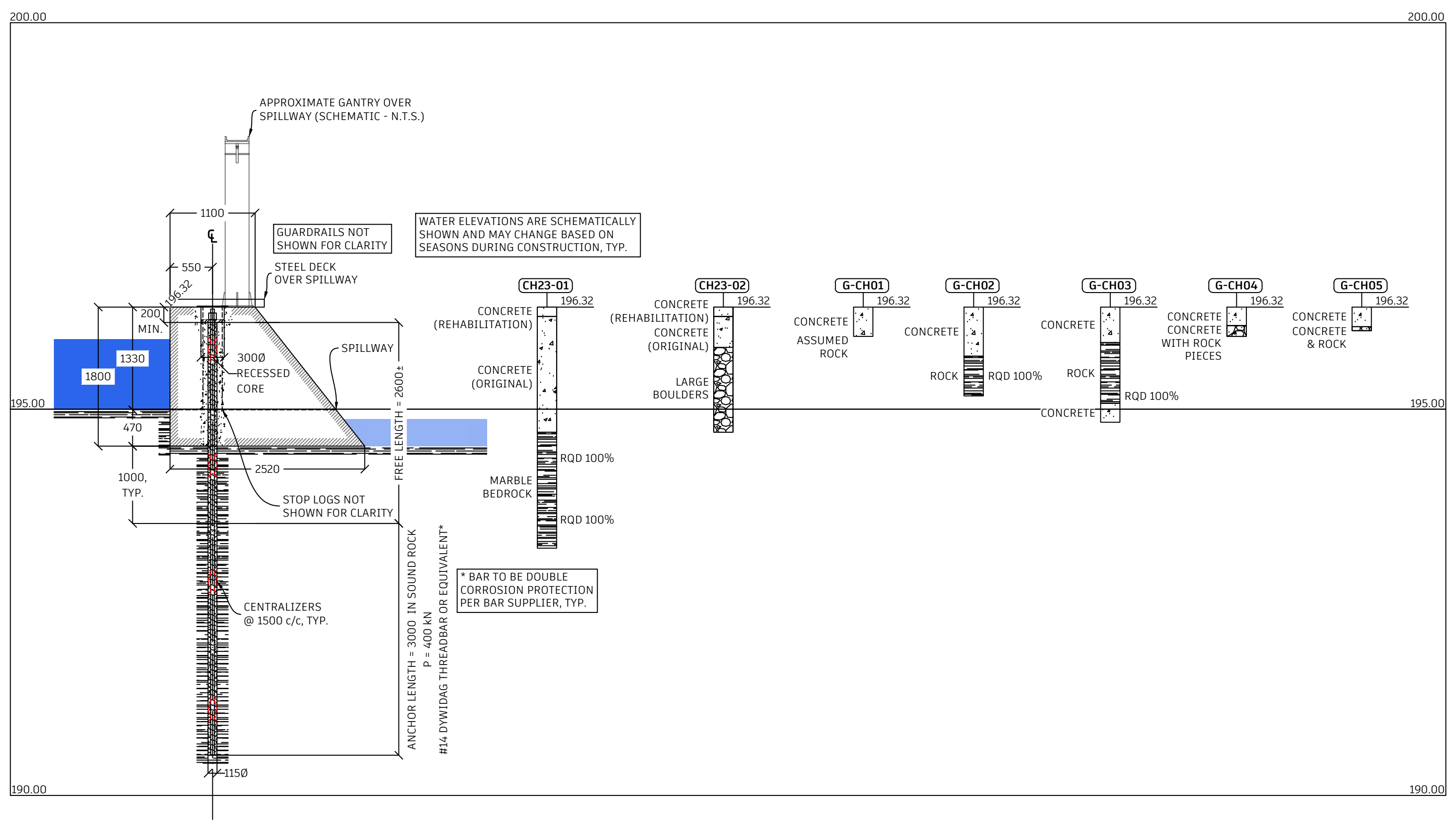
TYPICAL TIEDOWN DETAIL

1:10
0 100 200 300 mm



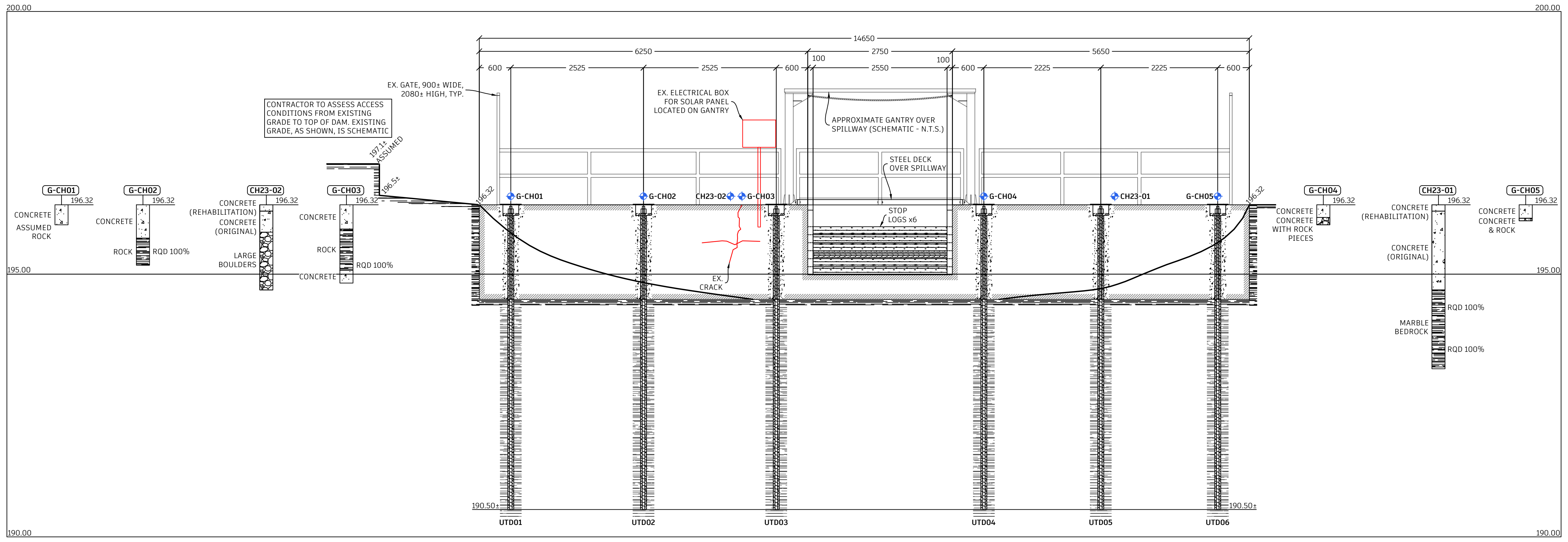
UPPER ARDEN DAM - PLAN

1:50
0 0.5 1 1.5 m



UPPER ARDEN DAM - TYPICAL SECTION

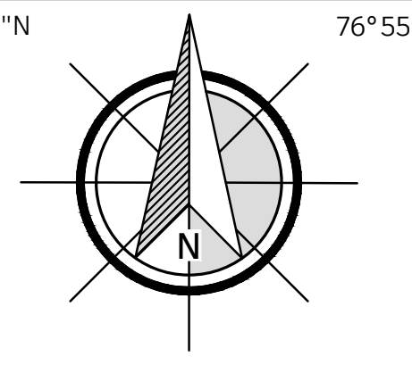
1:50
0 0.5 1 1.5 m



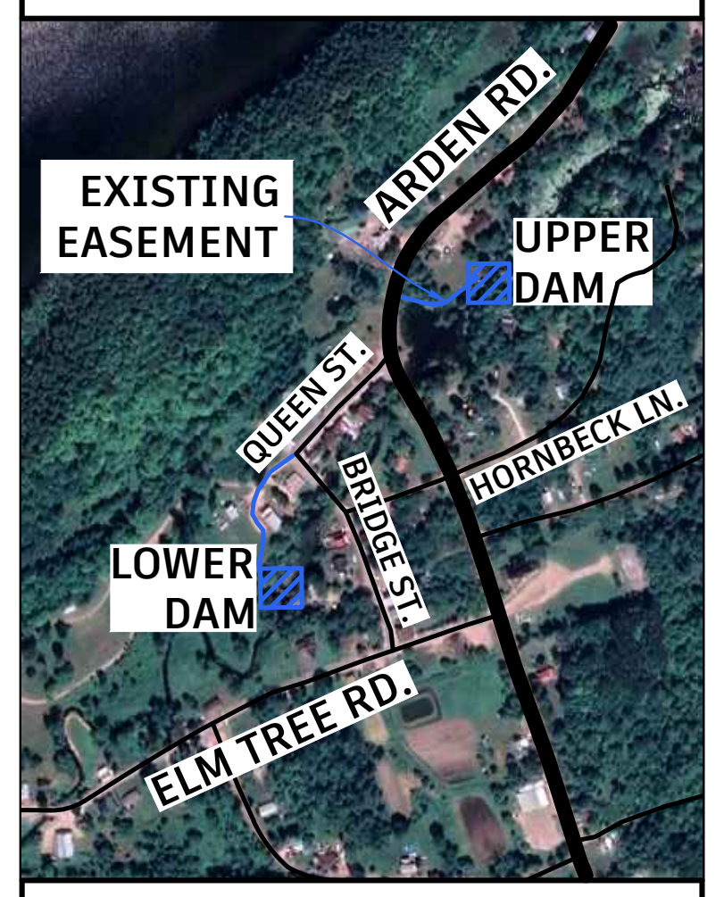
UPPER ARDEN DAM - DOWNSTREAM ELEVATION

1:50
0 0.5 1 1.5 m

44° 43'23.2"N
76° 55'26.5"W



KEY PLAN (N.T.S.)



UTILITY LEGEND

BE	BURIED ELECTRICAL
BT	BURIED TELECOMMUNICATIONS
COMB	COMBINED SEWER
GAS	GAS LINE
O/H	OVERHEAD LINE
SAN	SANITARY SEWER
STM	STORM SEWER
UNK	UNKNOWN
WM	WATERMAIN

No.	DRAWING DESCRIPTION	DATE
2	ISSUED FOR PERMIT/TENDER	25.02.28
1	ISSUED FOR REVIEW	25.01.31

DESIGN
A.S.

DRAWN BY
A.S. / M.G.

SCALE
1:50, 1:10

PRINT
25.02.28

25.02.28
A. J. SHAFFER
100200201

7142 TAMAR ROAD, MISSISSAUGA, ONTARIO, L5N 1Y8
GRAMEngineering.ca | t. 416-525-3484

CLIENT NAME
Quinte Conservation

PROJECT NAME
UPPER ARDEN DAM
ROCK ANCHOR TIEDOWNS

PROJECT ADDRESS
ARDEN MILL POND
CENTRAL FRONTENAC, ONTARIO

DRAWING TITLE
PERMANENT TIEDOWNS
NOTES, PLAN, SECTION, ELEVATION, DETAIL, & SCHEDULE

PROJECT NO.
24.072

DRAWING NO.
TD1