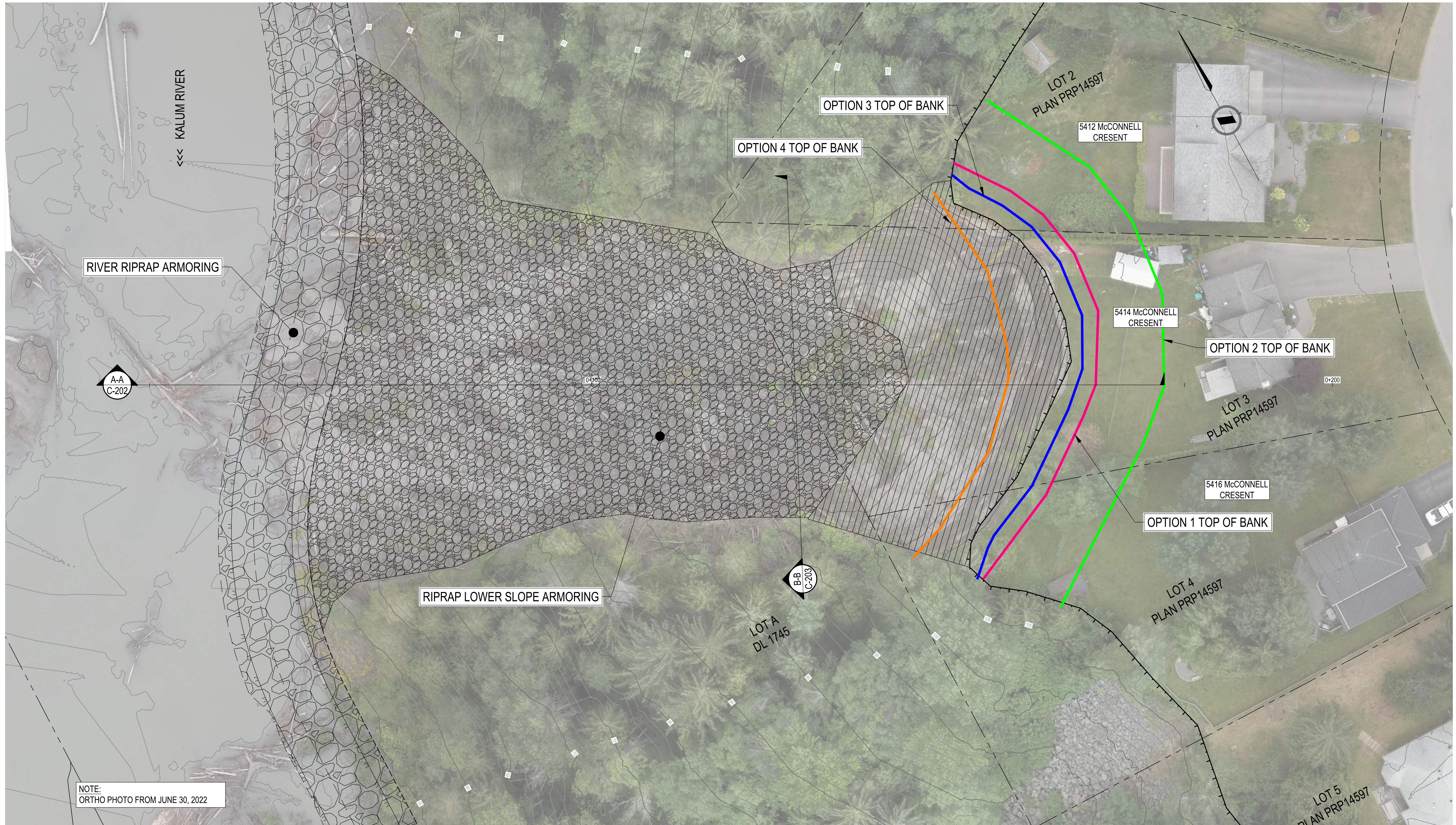


McElhanney ANS D-2018-08-11  
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NOTE:  
 ORTHO PHOTO FROM JUNE 30, 2022

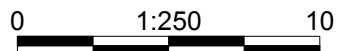
Rev	Date	Description	Drawn	Design	App'd
PA	2022-08-22	ISSUED FOR 75% REVIEW	JMD	CJH	
Rev			Drawn	Design	App'd

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ORIGINAL DWG SIZE: ANS D (22" x 34")



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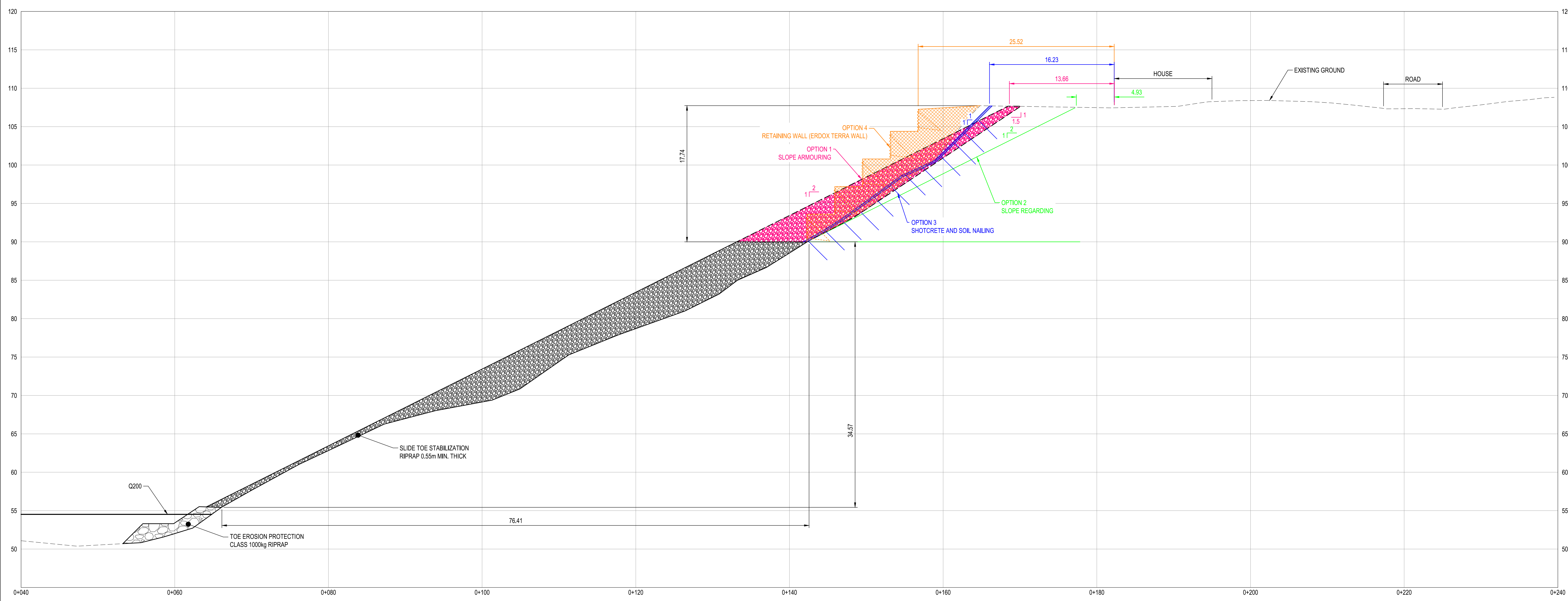
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**FLOOD MITIGATION  
 MCCONNELL SLIDE MITIGATION  
 CONCEPT - PLAN**

Drawing No.	C-201
Project Number	2321-02079-00
Rev.	PA

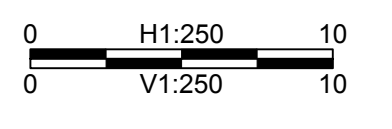
DESTROY ALL PRINTS BEARING PREVIOUS REVISION

DATE: 2022-08-22 10:45 AM FILE: \\2321\020\01\03\2022\05-01\03\mccconnell\_river\_flood\_mitigation\Plan\01\Drawings\02\_Engineering\03.1\_Sheets\22-02079-00\_Details.dwg  
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**FLOOD MITIGATION**  
**MCCONNELL SLIDE MITIGATION**  
**CONCEPT - SECTION A-A**

Drawing No.	
<b>C-202</b>	
Project Number	Rev.
2321-02079-00	PA

DESTROY ALL PRINTS BEARING PREVIOUS REVISION

McElhanney ANS/D-2018-08-11  
DATE: 2022-09-19 11:52 FILE: X:\2321\2021-02-07-15-00\Kitsumkalum River Flood Mitigation Plan\01 Drawings\02 Engineering\03.1 Sheets\221-2021-00 Riprap Access.dwg  
DRAWN: JMD  
DESIGNED: CJH  
APPROVED: [Signature]

### NOTES:

1. SITE SURVEY PERFORMED MAY 30, 2022 BY McELHANNEY LTD.
2. LIDAR FLOWN IN 2018.
3. SITE COORDINATES/ELEVATIONS DERIVED FROM GPS TIES TO INTEGRATED MONUMENT 95H1887.  
N: 6041615.281m  
E: 523495.290m  
ELEV: 102.176m
4. THIS DRAWING IS METRIC DISPLAYED IN UTM NAD 83 ZONE 9 COORDINATES.
5. ELEVATIONS ARE IN METRES, BASED ON GEODETIC DATUM CVD28, ESTABLISHED BY GNSS TIES TO INTEGRATED MONUMENT 95H1887 USING GEIOD MODEL HT 2.0.
6. CONTOUR INTERVAL: MAJOR 5.0m MINOR 1.0m.
7. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE NOTED.
8. LEGAL BOUNDARIES ARE APPROXIMATE FROM ParcelMap BC DATA.
9. LOCATIONS OF UNDER GROUND UTILITIES SHOWN ON PLAN ARE APPROXIMATE ONLY. INFORMATION MAY NOT BE COMPLETE OR ACCURATE. CONTRACTOR SHALL EXPOSE LOCATIONS OF ALL EXISTING UTILITIES AND ADVISE THE ENGINEER OF POTENTIAL CONFLICTS.

### ENVIRONMENTAL

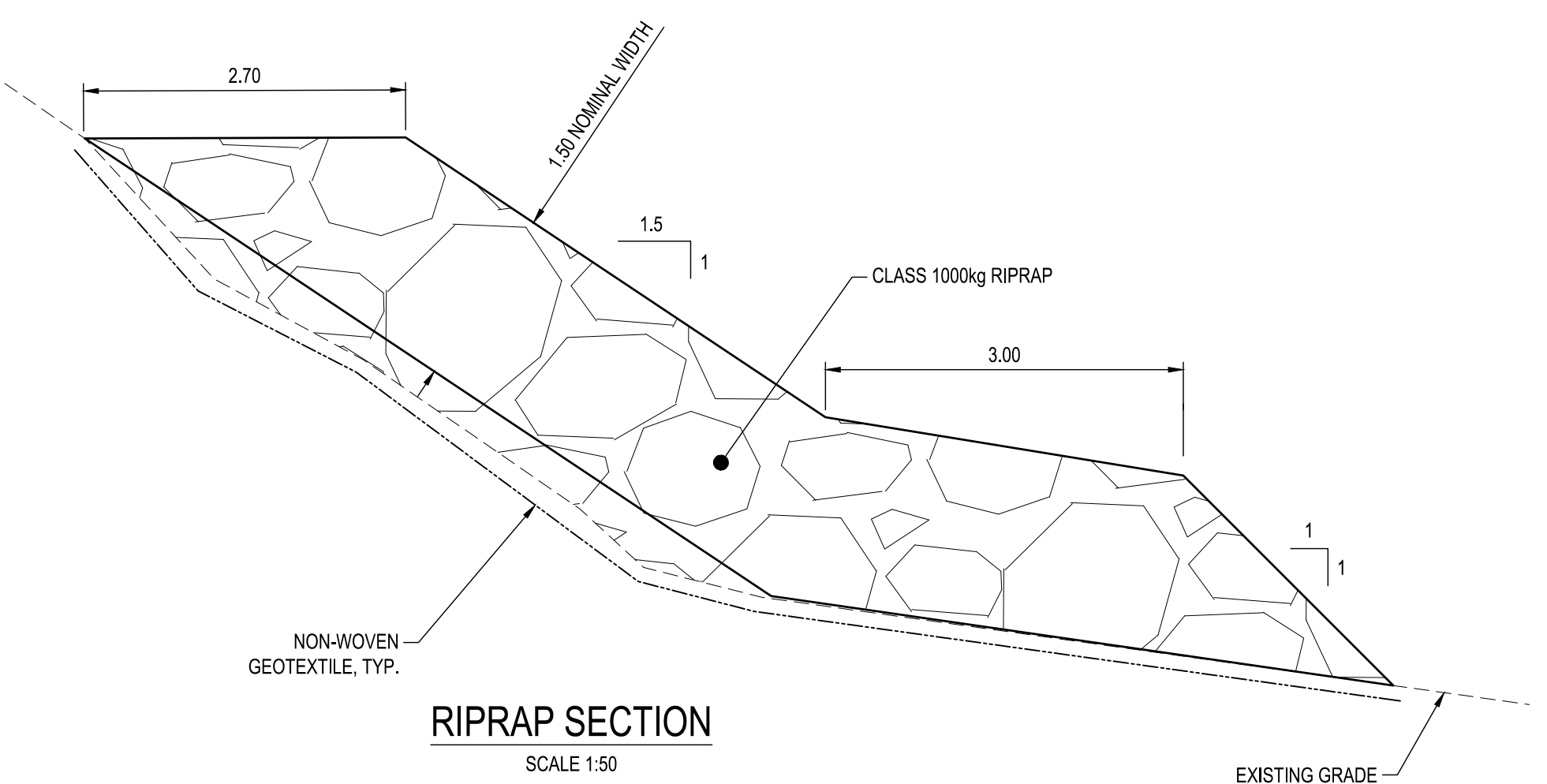
1. SEDIMENT MUST BE PREVENTED FROM ENTERING ANY WATERCOURSE, AS IT IS A VIOLATION UNDER THE FISHERIES ACT.
2. ALL WORK SHALL BE DONE IN A MANNER THAT WILL NOT RESULT IN DEPOSITION OF DEBRIS, SOIL, OR OTHER MATERIAL DELETERIOUS TO FISH, IN ANY WATERCOURSE.
3. ALL WORKS TO BE CONDUCTED FROM LAND, AND NO EQUIPMENT WILL BE PERMITTED IN ANY WATERCOURSE AT ANY TIME.
4. VERIFY RIP RAP TO BE USED IS CLEAN, IS OF SUITABLE QUALITY, AND IS PLACED SO AS NOT TO DISTURB NATURAL VEGETATION WITHIN THE RIPARIAN ZONE.
5. DISTURBANCE OF THE STREAMBANKS SHALL BE MINIMIZED. BANK STABILITY AND EROSION PREVENTION IS CRITICAL. LIMIT WORKS TO THE SURVEYED WORK AREA. THERE IS TO BE NO DISTURBANCE BEYOND THE ROAD RIGHT OF WAY.

### RIPRAP

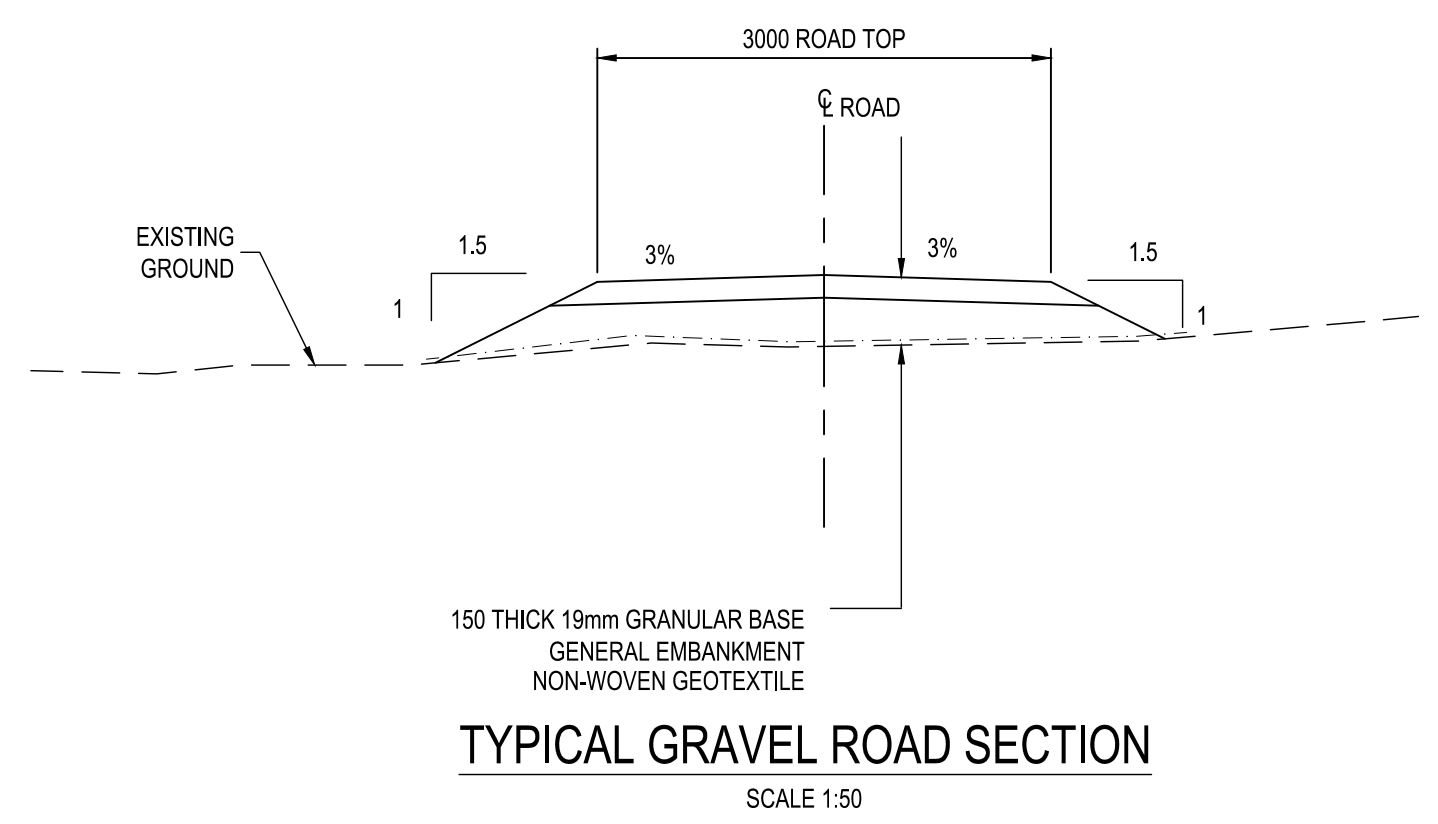
1. CLASS 1000kg RIPRAP PLACED TO A NOMINAL DEPTH OF 1500mm. ROCK SHALL BE HARD, DURABLE ANGULAR QUARRY ROCK GRADED AS FOLLOWS:  
CLASS 1000kg - 85% OF ROCK - AVERAGE SIZE OF ROCK = 1295mm  
- 50% OF ROCK - AVERAGE SIZE OF ROCK = 900mm  
- 15% OF ROCK - AVERAGE SIZE OF ROCK = 415mm
2. FOR VISUAL COMPREHENSION ONLY THE APPROXIMATE AVERAGE DIMENSION OF ANGULAR ROCK OF CLASS 1000kg IS 900mm.
3. ALL RIPRAP FILL TO BE NON ACID GENERATING ROCK.
4. ALL RIPRAP TO BE PLACED, NOT END DUMPED.

### NON-WOVEN GEOTEXTILE

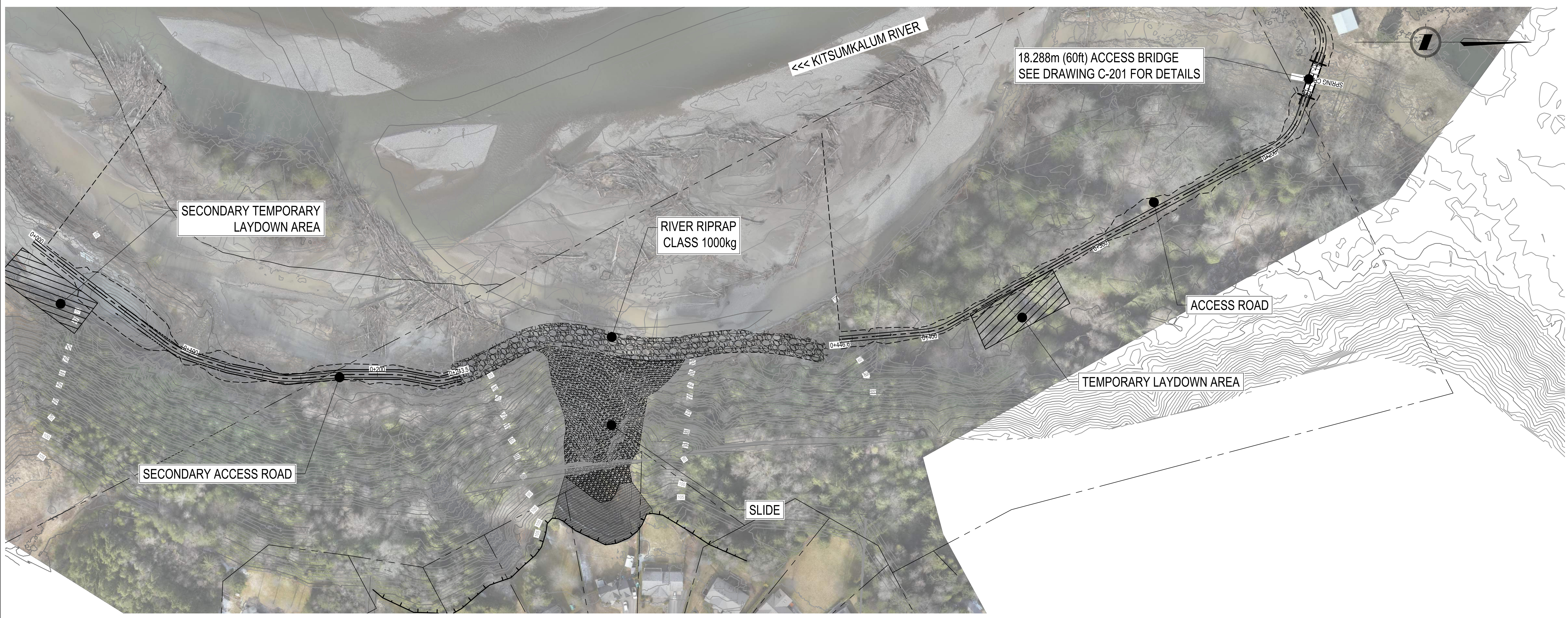
1. SPECIFICATIONS  
GRAB TENSILE STRENGTH 912 N ASTM-D4632  
ELONGATION 50 % ASTM-D4632  
CBR PUNCTURE 2336 N ASTM-D6241  
TRAPEZOIDAL TEAR 356 N ASTM-D4533
2. GEOTEXTILE FABRIC SHOULD HAVE A MINIMUM OF 800mm SIDE OVERLAPS. END OVERLAPS FOR BOTH LAYERS OF GEOGRID AND THE FILTER FABRIC SHOULD BE A MINIMUM OF 1.0m.



RIPRAP SECTION  
SCALE 1:50



TYPICAL GRAVEL ROAD SECTION  
SCALE 1:50



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ORIGINAL DWG SIZE: ANS/D (22" x 34")

**McElhanney**

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**FLOOD MITIGATION**  
MCCONNELL SLIDE MITIGATION  
TOE ARMOURING PLAN

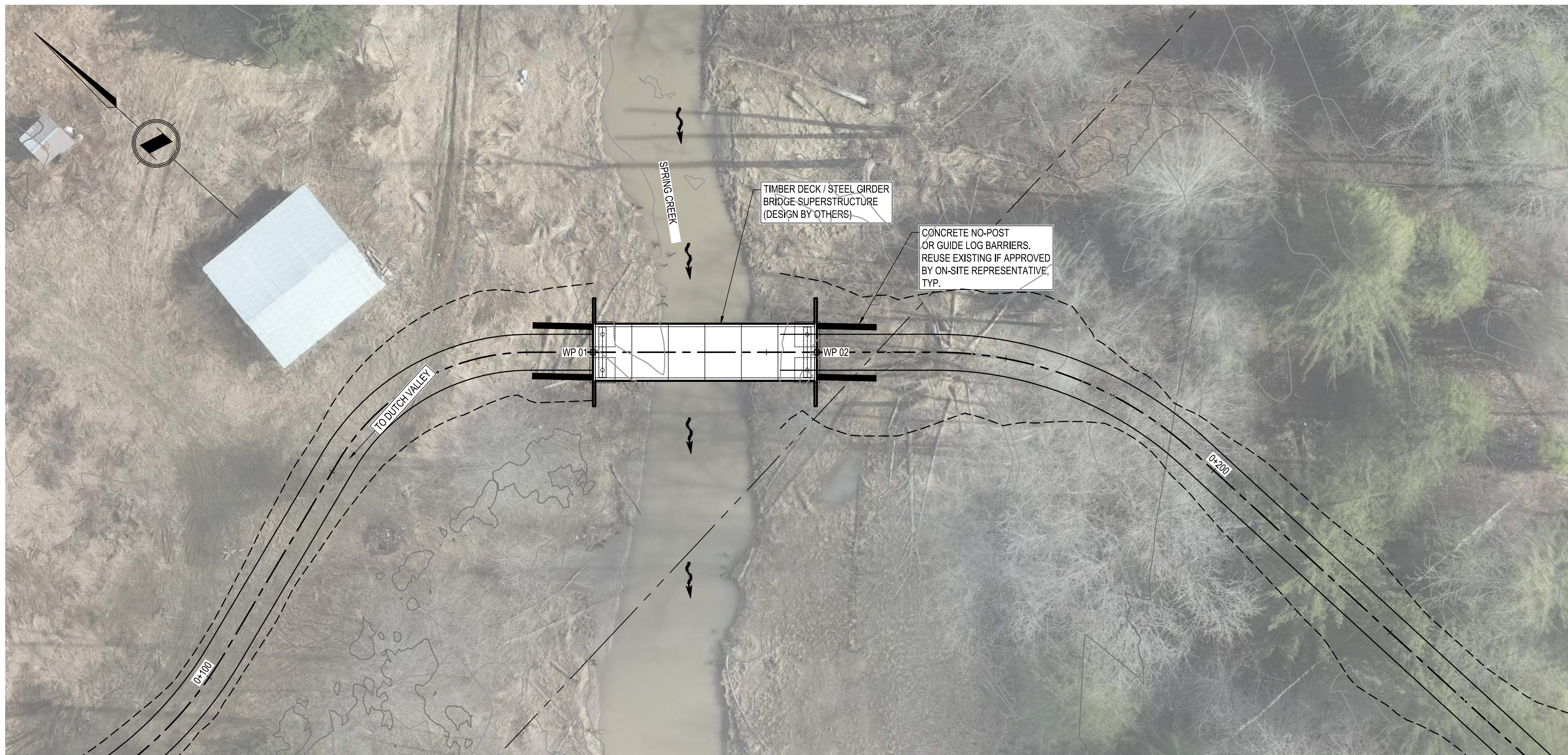
Drawing No.  
**C-200**

Project Number  
2321-02079-00

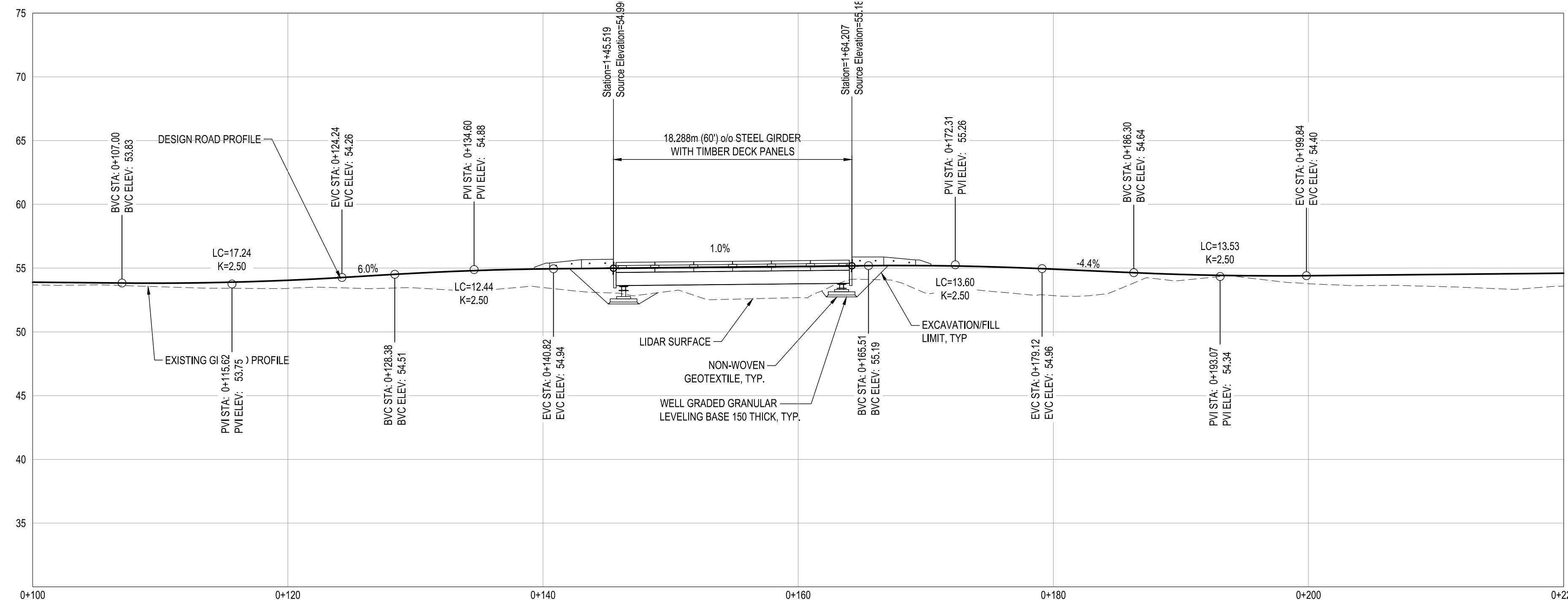
Rev.  
PA

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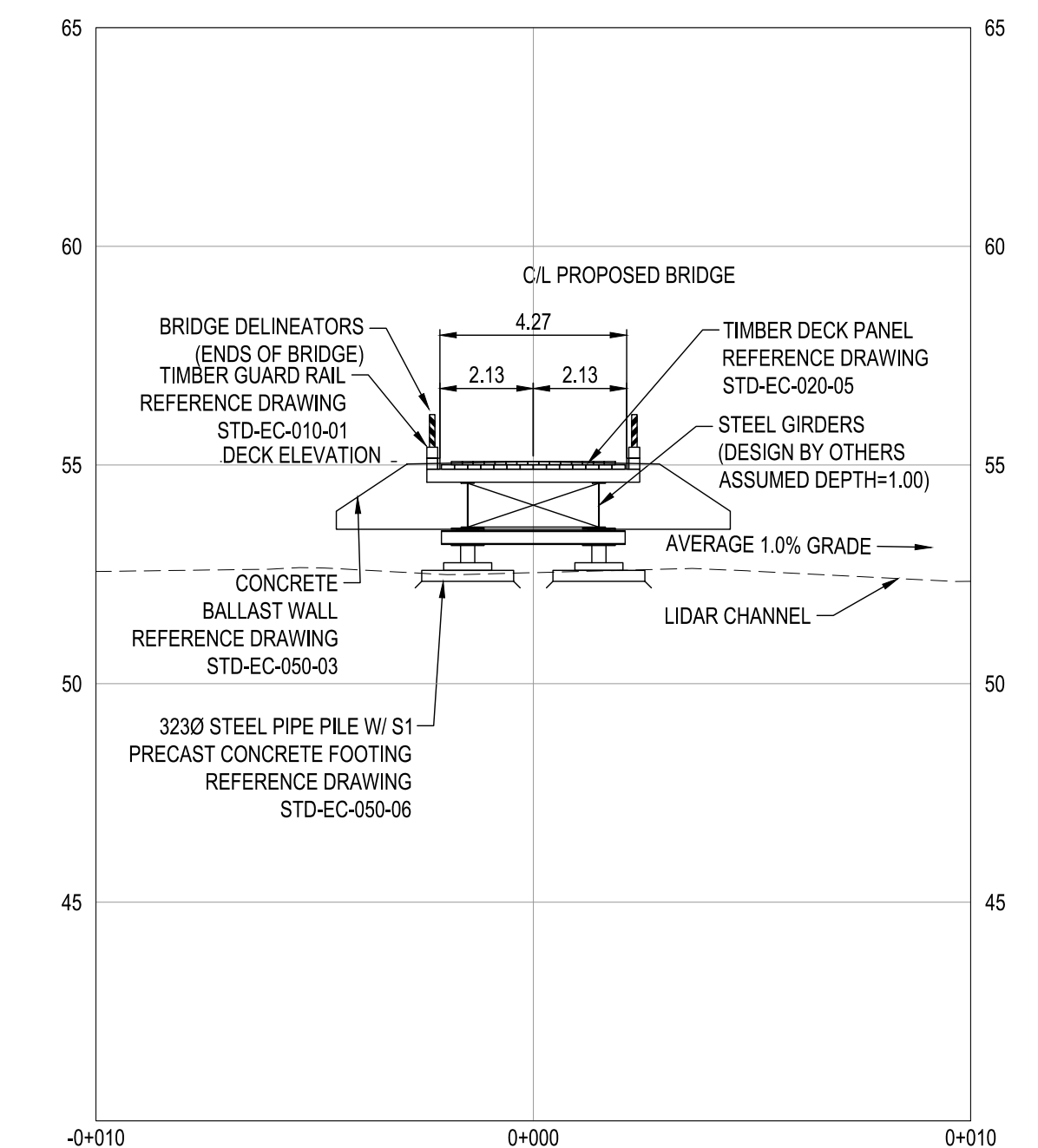
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**PLAN**  
SCALE 1:250



**PROFILE**  
SCALE 1:250



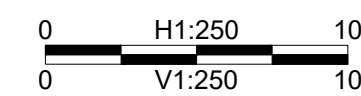
**SECTION**  
SCALE 1:150

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**FLOOD MITIGATION**  
**SPRING CREEK TEMP ACCESS**  
**BRIDGE GENERAL ARRANGEMENT**

Drawing No.

**C-201**

Project Number  
2321-02079-00

Rev.  
PA

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McElhanney ANSIC 2016-06-11  
DATE: 2022-09-19, 11:53 FILE: X:\2321\02079-00\232102079-00\Drawings\10.3.1\_Schematics\2321-02079-00\_Riprap\_Access.dwg  
McElhanney ANSIC 2016-06-11  
DRAWN: JMD, DESIGNED: C.J.H., APP'D: C.J.H.

### GENERAL NOTES:

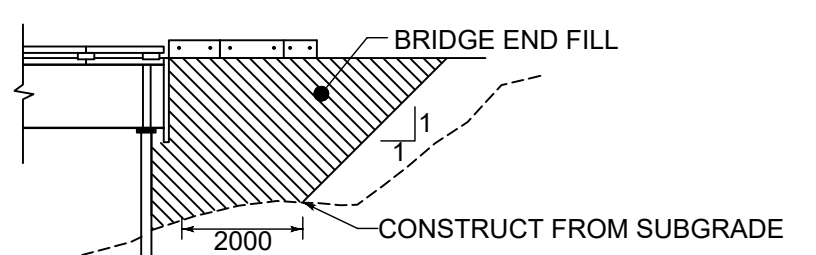
- SITE SURVEY PERFORMED ?????? BY McELHANNEY.
- COORDINATES ARE IN NAD83 (CSRS), UTM ZONE ??
- ELEVATIONS ARE IN METRES BASED ON GEODETIC DATUM USING GEIOD MODEL HT 2.0.
- SITE LOCATION:  
UTM COORDINATES: N: 6042818.22m E: 523210.11m  
GEOGRAPHIC: LAT: 54°31'56.6" LONG: 128°38'28.8"
- CONTOUR INTERVAL: MAJOR 1.0m MINOR 0.5m
- ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE NOTED.
- STREAMBED MATRIX: UNKNOWN
- STREAM CLASSIFICATION: UNKNOWN
- THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF THE COMMENCEMENT OF THE PROJECT WITH REASONABLE FORWARNING, AND SHALL NOTIFY THE ENGINEER OF THE PROJECT PROGRESS ON A DAILY BASIS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING THEMSELVES AWARE OF ALL CONDITIONS ASSOCIATED WITH THE BRIDGE INSTALLATION.
- FOLLOWING COMPLETION OF THE PROJECT THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL LEFT OVER CONSTRUCTION MATERIALS AND REFUSE.
- BRIDGE SUPER STRUCTURE DESIGNED BY OTHERS.
- DRAWING SHALL NOT BE USED FOR CONSTRUCTION UNLESS MARKED "ISSUED FOR CONSTRUCTION" AND SEALED BY A PROFESSIONAL ENGINEER.

### NON-WOVEN GEOTEXTILE

- SPECIFICATIONS  
GRAB TENSILE STRENGTH 912 N ASTM-D4632  
ELONGATION 50 % ASTM-D4632  
CBR PUNCTURE 2336 N ASTM-D6241  
TRAPEZOIDAL TEAR 356 N ASTM-D4533
- GEOTEXTILE FABRIC SHOULD HAVE A MINIMUM OF 800mm SIDE OVERLAPS. END OVERLAPS FOR NON-WOVEN GEOTEXTILE SHOULD BE A MINIMUM OF 1.0m.

### BRIDGE END FILL

- BRIDGE END FILL SHALL FOLLOW THE MINISTRY OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION" SECTION 202.23 REQUIREMENTS EXCEPT AS INDICATED BELOW. BRIDGE END FILL LIMITS SHALL BE IN ACCORDANCE WITH THE FOLLOWING SKETCH:



### GROUTING

- GROUT TO BE TARGET PORTLAND EXPANDING GROUT OR APPROVED EQUAL. GROUT SHALL BE MIXED AND PLACED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND SHALL ACHIEVE A MINIMUM COMPRESSIVE STRENGTH OF 35 MPa @ 28 DAYS. FOR LOW TEMPERATURE APPLICATION USE CAPPAR LT GROUT, OR APPROVED EQUAL.
- BASE MATERIALS AND GROUT SHALL BE KEPT AT TEMPERATURES AND STORAGE CONDITIONS IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.

### FOUNDATION

- SITE SPECIFIC GEOTECHNICAL SITE INVESTIGATIONS WERE NOT INCLUDED IN THE SCOPE OF SERVICES FOR THE DESIGN OF A MAJORITY OF THESE STRUCTURES. GROUND CONDITIONS MAY VARY. THE FOUNDATION REQUIREMENTS AND STRUCTURE CONCEPT MAY NEED TO BE MODIFIED BY THE ENGINEER TO ACCOMMODATE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.
- LINE THE FOUNDATION EXCAVATION WITH A NON-WOVEN GEOTEXTILE (CLASSIFIED AS CLASS 2 NON-WOVEN IN ACCORDANCE WITH AASHTO M 288-96) TO PREVENT WASHING OF FINES FROM UNDER AND BEHIND STRUCTURE FOUNDATION.

### BACKFILL AND COMPACTION

- THE ZONE OF COMPACTION SHALL BE AS SHOWN ON THE DRAWING AND COMPACTED TO 98% OF STANDARD PROCTOR DENSITY, AT OPTIMUM MOISTURE CONTENT. MATERIAL COMPACTION TESTING MAY BE REQUIRED BY THE ENGINEER'S REPRESENTATIVE.
- BACKFILLING MATERIAL TO BE FREE DRAINING GRANULAR MATERIAL THAT IS APPROVED BY THE ENGINEER'S REPRESENTATIVE PRIOR TO ALL BACKFILLING OPERATIONS.
- BACKFILLING TO BE COMPLETED IN LEVEL LIFTS OF APPROVED MATERIAL, 150mm TO 300mm THICK AND COMPACTED AS SPECIFIED ON DRAWINGS.

### CONCRETE

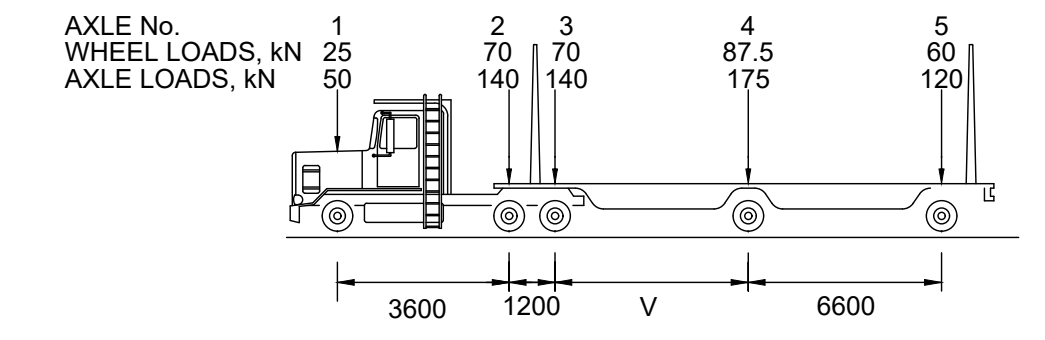
- CONCRETE TO CSA A23.1 AND TESTED TO CSA A23.2.
- PRECAST CONCRETE TO CSA A23.4 BY CSA CERTIFIED PRECAST CONCRETE PLANT.
- REINFORCING STEEL TO BE DEFORMED BARS TO CSA G30.18 GRADE 400R.
- CONCRETE COVER 50mm UNLESS NOTED OTHERWISE.
- ALL EXPOSED FACES TO HAVE 20mm CHAMFER UNLESS NOTED OTHERWISE.
- PRECAST CONCRETE MIX AS FOLLOWS:
  - MINIMUM COMPRESSIVE STRENGTH @ 28 DAYS=35MPa.
  - MAXIMUM AGGREGATE SIZE 20mm
  - 5% (± 1%) ENTRAINED AIR
  - MAXIMUM WATER/CEMENT RATIO 0.38
  - SLUMP 30mm (± 20mm)

### BEARINGS

- NATURAL RUBBER ELASTOMERIC BEARING PADS TO HAVE A SHEAR MODULUS BETWEEN 0.6 AND 1.75 MPa AND A NOMINAL SHORE A DUROMETER HARDNESS BETWEEN 50 AND 60, GRADE 5, TO CSA-S6 CLAUSE 11.5.8.3.

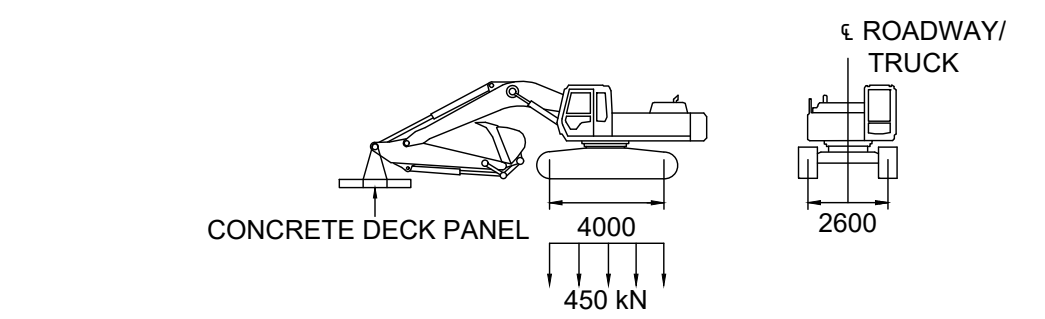
### DESIGN

- DESIGN IN GENERAL ACCORDANCE WITH CAN/CSA S6-14 DESIGN OF SPECIFICATIONS MODIFIED TO BCFS TO BCL-625 LOADING (63,710 kg. G.V.W) E=400, DISTRIBUTION = 50/50, AND THE FOREST SERVICE BRIDGE DESIGN & CONSTRUCTION MANUAL. ALL WORKS TO BE IN GENERAL CONFORMANCE WITH CAN/CSA-S6-14 AND THE FOREST SERVICE BRIDGE AND CONSTRUCTION MANUAL.



V=VARIABLE SPACING - 6.6m TO 18m INCLUSIVE. SPACING TO BE USED IS THAT WHICH PRODUCES THE MAXIMUM STRESSES.

- MAXIMUM CONSTRUCTION LOADING TO CONSIST OF A 38,600 kg (80,000 lb) EXCAVATOR TRANSPORTING ONE DECK PANEL, WITH ALL DECK PANELS PLACED ON THE STRUCTURE ACTING NON-COMPOSITE (TO ALLOW FOR FUTURE COMPOSITE DECK).



### ENVIRONMENTAL

- SEDIMENT MUST BE PREVENTED FROM ENTERING THE NEARBY WATERCOURSES, AS IT IS A VIOLATION UNDER THE FISHERIES ACT.
- ALL WORK SHALL BE DONE IN A MANNER THAT WILL NOT RESULT IN DEPOSITION OF LOGGING DEBRIS, SOIL, OR OTHER MATERIAL DELETERIOUS TO FISH, IN ANY WATERCOURSE.
- CROSSING OF CREEKS SHALL CONFORM TO AND APPROVAL MUST BE OBTAINED IN ACCORDANCE WITH FLNRO "FISH-STREAM CROSSING GUIDEBOOK" AND OIL AND GAS COMMISSION "OIL AND GAS ROAD REGULATIONS".
- ENSURE RIPRAP TO BE USED IS CLEAN, IS OF SUITABLE QUALITY AND IS KEYS INTO THE BANK SUCH THAT IT DOES NOT CONSTRICT THE CHANNEL BY EXTENDING INSIDE THE EXISTING BANK CONFIGURATION.
- DISTURBANCE TO THE STREAMBANKS MUST BE MINIMIZED. BANK STABILITY AND EROSION PREVENTION IS CRITICAL. RECONSTRUCT AND REVEGETATE DISTURBED BANKS TO THEIR ORIGINAL CONDITION AS SOON AS ACTIVITY IS COMPLETED.
- ALL ACID ROCK DRAINAGE (ARD) AND POTENTIAL ACID GENERATING (PAG) ROCK TO BE REMOVED FROM SITE TO AN APPROVED LOCATION.
- ALL WORK TO BE PERFORMED WITHIN MINISTRY OF FORESTS.

### QUALITY CONTROL

- QUALITY CONTROL DOCUMENTS FOR ALL PRECAST AND FABRICATED COMPONENTS SHALL BE PROVIDED BY THE CONTRACTOR TO THE ENGINEER'S REPRESENTATIVE PRIOR TO STRUCTURE INSTALLATION. THESE DOCUMENTS SHALL, AT MINIMUM, INCLUDE:
  - PROOF OF PLANT CSA CERTIFICATION (WELDING OR PRECAST)
  - STEEL MILL TEST CERTIFICATES (OR EQUIVALENT) FOR EACH COMPONENT
  - WELDING INSPECTION REPORTS FOR FRACTURE CRITICAL COMPONENTS
  - PLANT REBAR INSPECTION REPORTS PRIOR TO POUR FOR EACH COMPONENT
  - CONCRETE TEST RESULTS FOR EACH COMPONENT
  - BEARING PAD ELASTOMER TEST RESULTS
- SHOP DRAWINGS SHALL BE PROVIDED TO THE ENGINEER'S REPRESENTATIVE FOR REVIEW AT LEAST 10 DAYS PRIOR TO FABRICATION/POURING. FABRICATION/POURING SHALL NOT PROCEED WITHOUT REVIEWED SHOP DRAWINGS.

### STEEL

- ALL STEEL GIRDERS SHALL BE CONSIDERED TO BE FRACTURE CRITICAL AND SHALL BE FABRICATED IN ACCORDANCE WITH CAN/CSA-S6-06 SECTION 10.23. FABRICATORS RESPONSIBLE FOR WELDED CONSTRUCTION MUST BE CERTIFIED FOR DIVISION 1 OR DIVISION 2.1 TO CURRENT VERSION OF CAN/CSA W47.1. CERTIFICATION OF COMPANIES FOR FUSION WELDING OF STEEL STRUCTURES.
- WHERE PIPE WELDING IS REQUIRED, WELDING MUST BE UNDERTAKEN BY A COMPANY CERTIFIED TO DIVISION 3 OR BETTER TO CURRENT VERSION OF CAN/CSA W47.1.
- SHOP AND FIELD WELDING TO CURRENT VERSION OF CAN/CSA W59. ELECTRODES TO BE COMPATIBLE WITH BASE METAL. MINIMUM 6 mm FILLET WELDS UNLESS NOTED OTHERWISE.
- STRUCTURAL STEEL PLATE TO CURRENT VERSION OF CAN/CSA G40.20/G40.21, GRADE 350AT, CATEGORY 3. GRADE 350A FOR STOCK SECTIONS.
- MISCELLANEOUS STEELWORK TO CURRENT VERSION OF CSA G40.20/G40.21 GRADE 350A.
- STEEL PIPES TO ASTM A252, Grade 2, 12.7 mm MINIMUM THICKNESS.
- STRUCTURAL BOLTS FOR STEELWORK TO BE 22 mm Ø ASTM A325M, Type 3, UNLESS NOTED OTHERWISE. AND SHALL INCLUDE NUTS AND WASHERS AS REQUIRED.
- BOLTED CONNECTIONS SHALL BE INSTALLED IN ACCORDANCE WITH CAN/CSA S6-06, SECTION 10.24.6 USING TURN-OF-NUT TIGHTENING.
- ANCHOR BOLTS TO CONSIST OF GALVANIZED ASTM A193 TYPE B7 THREADED RODS & GALVANIZED HEX NUTS AND WASHERS, UNLESS NOTED OTHERWISE.
- GALVANIZING TO CURRENT VERSION OF CAN/CSA G164M. ALL GALVANIZED COMPONENTS CUT OR DAMAGED SHALL BE FIELD TREATED WITH TWO COATS OF ZINC-RICH PAINT.

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0 10 H1:250  
0 10 V1:250

ORIGINAL DWG SIZE: ANSIC D (22" x 34")

**McElhanney**

Suite 1  
5008 Pihle Avenue  
Terrace BC  
Canada V8G 4S8  
T 250 635 7163

**PRELIMINARY**  
NOT FOR CONSTRUCTION

THIS DRAWING HAS NOT BEEN APPROVED AND MAY CONTAIN ERRORS AND OMISSIONS

CITY OF TERRACE  
5003 GRAHAM AVE., TERRACE, BC, V8G 1B3

**FLOOD MITIGATION**  
**SPRING CREEK TEMP ACCESS**  
**BRIDGE NOTES**

Drawing No.	
<b>C-202</b>	
Project Number	Rev.
2321-02079-00	PA

DESTROY ALL PRINTS BEARING PREVIOUS REVISION