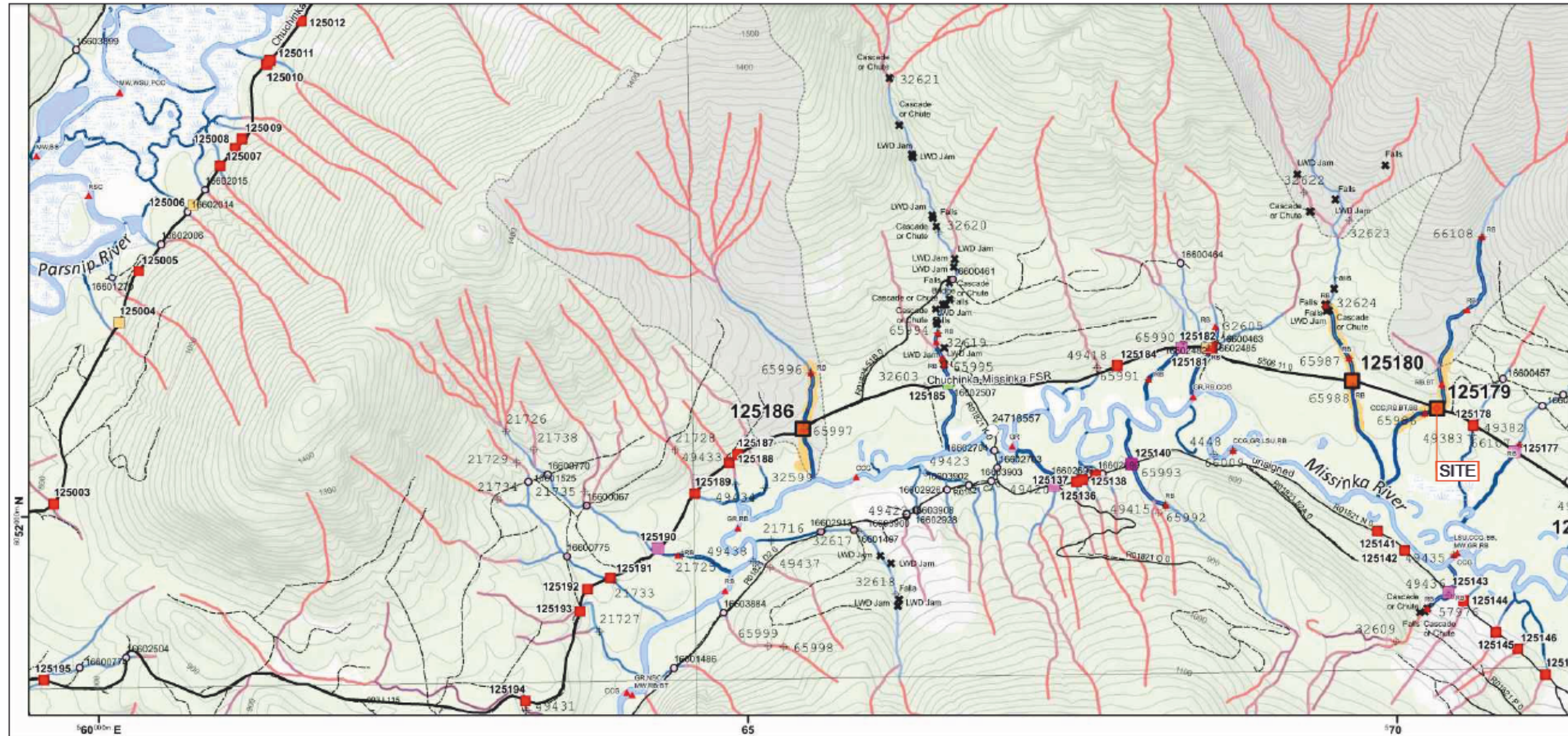


PROPOSED PERMANENT 15.240m [50'] O/A LENGTH STEEL GIRDER WITH MODULAR TIMBER DECK BRIDGE FOR: CHUCHINK-MESSINKA FSR AT 12km SITE: 125179 (121° 54' 42" N , 54° 37' 06" W)



DWG No:2052-1-SITE 125179-001

SHEET: 1 OF 6

DESIGN BY: JUSTIN BEVERIDGE, P.ENG.
 DESIGN DATE: SEPTEMBER 4, 2020
 REVIEWED BY: PAUL MYSAK, P.ENG
 DRAWN BY: TODD FORBES
 SITE VISIT: ONSITE ENGINEERING LTD.
 SITE VISIT DATES: AUGUST 18, 2020
 FILE NAME: SITE125179.DWG
 SCALE: AS NOTED
 REVISION NUMBER:
 REVISION DATE:
 ALL MEASUREMENTS IN m UNLESS OTHERWISE NOTED.

DRAWING INDEX:
 SHEET 2 OF 6 - NOTES
 SHEET 3 OF 6 - PLAN AND STREAM PROFILE VIEWS
 SHEET 4 OF 6 - ELEVATION AND ROAD PROFILE VIEWS
 SHEET 5 OF 6 - ABUTMENT CROSS SECTIONS
 SHEET 6 OF 6 - SITE PHOTOS



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NOTES:

1. **COORDINATING REGISTERED PROFESSIONAL:** MICHAEL WATSON, RPF

2. DURATION:

2.1. FOR THE PURPOSES OF THIS DESIGN THE TERM PERMANENT AS IT REFERS TO DURATION OF THIS INSTALLATION MEANS FORTY FIVE (45) YEARS OR LESS.

3. DESIGN LIVE LOAD:

3.1. DESIGN VEHICLE: BCFS L-100 AS PER MOFLNRORD (STD-EC-000-001 TO 002).

4. STRUCTURE:

- 4.1. SUPERSTRUCTURE TO BE PROVIDED BY OTHERS. SUPERSTRUCTURE DESIGN TO BE IN ACCORDANCE WITH CAN/CSA-S8 (MODIFIED AS PER MOFLNRORD INTERIM BRIDGE DESIGN GUIDELINES JULY 23-2010) AND IS TO TAKE INTO ACCOUNT LOGGING TRUCKS WITH UNBALANCED LOADS AND OFF-CENTER DRIVING.
- 4.2. EXCEPT AS NOTED, SPECIFICATIONS TO BE AS PER MOFLNRORD STANDARD DRAWINGS FOR TIMBER DECK BRIDGES (STD-EC-020-01 TO 07), LOCK BLOCK ABUTMENT AND CONSTRUCTION PADS (STD-EC-050-01 AND STD-EC-050-13, STD-EC-050-15), AND NO POST BARRIERS/GUIDE LOGS (STD-E-010-05).
- 4.3. IF SUPERSTRUCTURE HAS BEEN USED PREVIOUSLY AT ANOTHER LOCATION IT MUST BE INSPECTED BY A PROFESSIONAL ENGINEER PRIOR TO USE AT THIS SITE. IF A NEW STRUCTURE IS PLANNED, OEL IS TO REVIEW FABRICATION DRAWINGS PRIOR TO FABRICATION OF SUPERSTRUCTURE FOR COMPLIANCE WITH THIS DESIGN.
- 4.4. CHECK REQUIRED BEARING TO BEARING DISTANCE AND DEPTH OF ACTUAL STRUCTURE PRIOR TO CONSTRUCTION OF THE ABUTMENTS. BOTTOM OF GIRDER ELEVATIONS TO GOVERN.
- 4.5. GENERAL ARRANGEMENT DRAWING. SOME SUPERSTRUCTURE COMPONENTS NOT SHOWN. REFER TO FABRICATION DRAWINGS.

5. DESIGN OF ROAD APPROACHES AND DECK WIDTH:

- 5.1. HORIZONTAL ALIGNMENT AND ROAD WIDTHS TO PERMIT W-19 TRUCKS WITH 0.5m CLEARANCE INSIDE CURBS.
- 5.2. DESIGN ROAD WIDTH: 5m UNLESS NOTED OTHERWISE.

6. CREEK NOTES:

- 6.1. STREAM RIPARIAN CLASS IS S3 BASED ON STREAM WIDTH AND FISH PRESENCE/ACCESS (SERNBC).
- 6.2. STREAM BED MATERIAL CONSISTS OF GRAVEL, COBBLES AND BOULDERS UP TO 0.35m.
- 6.3. THE DESIGN FLOOD IS EXPECTED TO BE: CLEARWATER FLOOD DEBRIS FLOOD DEBRIS FLOW
- 6.4. DESIGN FLOOD: Q100 = 13m³/s @ 2m/s. THE PEAK FLOW FOR DESIGN PURPOSES WAS DETERMINED BASED ON REVIEW OF CHANNEL CHARACTERISTICS, PREVIOUS HIGH FLOW EVIDENCE, AND REVIEW OF THE RESULTS OF PEAK FLOW EMPIRICAL MODELS SUCH AS THE RATIONAL METHOD AND A REGIONAL ANALYSIS. WATERSHED CHARACTERISTICS, AND OTHER RELEVANT INFORMATION ARE ALSO USED TO ESTIMATE PEAK FLOW.
- 6.5. MODERATE LIKELIHOOD OF WOODY DEBRIS MOVEMENT.
- 6.6. CLIMATE CHANGE: CLIMATE CHANGE WAS CONSIDERED IN THE Q100 FLOOD ASSESSMENT. LIKELY CHANGES TO INTENSITY-DURATION-FREQUENCY CURVES UNDER CLIMATE CHANGE (IDF-CCTool-<https://idf-cc-uwo.ca>) DEVELOPED BY WESTERN UNIVERSITY, CANADA AND LIKELY CHANGES TO CLIMATE VARIABLES NOTED IN PLAN2ADAPT BY THE PACIFIC CLIMATE IMPACTS CONSORTIUM (<https://pacificclimate.org/>) WERE USED TO ESTIMATE THE LIKELY INCREASE IN THE DESIGN FLOOD OVER THE PLANNED LIFE SPAN OF THE STRUCTURE.

7. GEOTECHNICAL:

- 7.1. FOUNDATION DESIGN REFERENCES THE CANADIAN FOUNDATION ENGINEERING MANUAL. SUBSURFACE INFORMATION HAS BEEN INFERRED FROM SITE OBSERVATIONS OF SOIL EXPOSURES IN ROAD CUTS AND ALONG STREAMBANKS AND FROM SHALLOW HAND DUG TEST PITS AND PROBES (SEE DESCRIPTION ON SHEET 4). NO DETAILED SUBSURFACE FIELD INVESTIGATION WAS CONDUCTED (LARGE TEST PITS OR BORE HOLES). FIELD CONDITIONS MAY VARY FROM THOSE INFERRED. IF, UPON EXCAVATION, FIELD CONDITIONS VARY FROM THOSE INFERRED, THEN CHANGES TO THE FOUNDATION DESIGN OR INSTALLATION MAY BE REQUIRED.
- 7.2. FOOTING DESIGN BASED ON ASSUMED SOIL BEARING CAPACITY OF 200kPa.

8. FIELD REVIEWS:

- 8.1. A PROFESSIONAL ENGINEER OR THEIR DESIGNATE IS REQUIRED TO INSPECT THE FOLLOWING ACTIVITIES PRIOR TO PROVIDING RECORD DRAWINGS AND A CROSSING ASSURANCE STATEMENT:
 - LAYOUT OF RIPRAP/ABUTMENT LOCATION PRIOR TO INITIAL EXCAVATION
 - FOUNDATION SOILS FOLLOWING EXCAVATION
 - RIPRAP AND ABUTMENT CONSTRUCTION
 - BACKFILL MATERIAL AND TECHNIQUE
 - OTHER SITE INSPECTIONS AT THE DISCRETION OF THE PROFESSIONAL

9. INSTALLATION NOTES:

- 9.1. RIPRAP SOURCE HAS NOT BEEN IDENTIFIED.
- 9.2. NOTE THAT WHERE EXCAVATION SPECIFICATIONS ON THESE DRAWINGS CONFLICT WITH WORKSAFEBC REGULATIONS, WORKSAFEBC REGULATIONS ARE TO GOVERN.

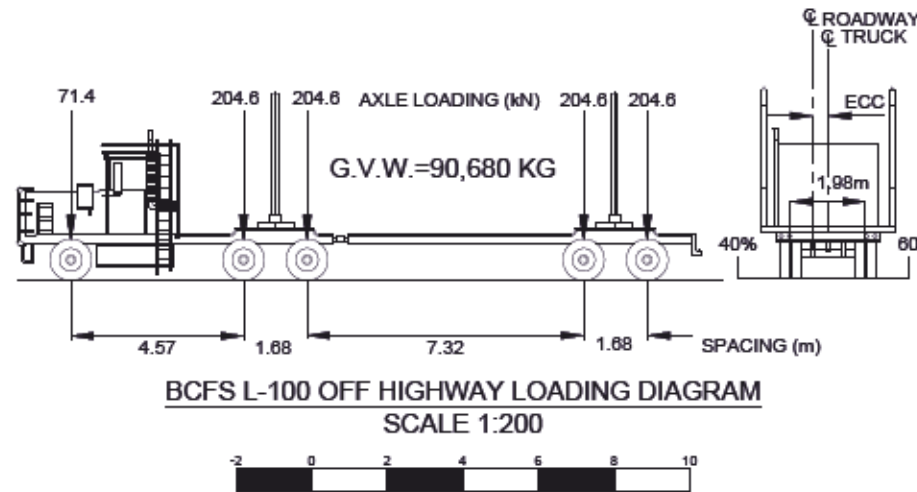
ENVIRONMENTAL NOTES:

- 1. WORK TO PROCEED IN ACCORDANCE WITH DFO AND BCMOEECS CONDITIONS NOTED AT THE WEB SITE: <http://www.dfo-mpo.gc.ca/pnw-ppp/measures-mesures/measures-mesures-eng.html> THE BCMOEECS REGIONAL TERMS AND REGIONAL PERIODS OF LEAST RISK TO RESIDENT FISH SPECIES AND FISH REMOVAL/RELOCATION FOR IN-STREAM WORK ALSO APPLY IF THE STREAM HAS FISH PRESENT OR IS CLASSIFIED AS S1 THROUGH S4.
- 2. A SEDIMENT MANAGEMENT PLAN WITH SPECIFIC MITIGATION MEASURES TO MINIMIZE SILTATION MUST BE ON SITE. MACHINE CROSSINGS MUST BE LIMITED TO 2 UNLESS OTHERWISE INCREASED OR DECREASED BY A QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP).
- 3. ALTERATION TO STREAM BANKS AND IN-STREAM WORK (EXPECTED) SHOULD BE SUPERVISED BY AN ENVIRONMENTAL MONITOR.
- 4. REMOVE THE MINIMUM AMOUNT OF RIPARIAN VEGETATION NECESSARY TO INSTALL A SAFE STRUCTURE. VEGETATE DISTURBED SLOPES AS SOON AS PRACTICABLE.
- 5. MACHINERY IS TO BE CLEAN AND LEAK FREE WHILE ON SITE. PETROLEUM PRODUCTS MUST BE CAREFULLY MONITORED WITH NO FUELING WITHIN THE RIPARIAN MANAGEMENT AREA.
- 6. DIRECT SURFACE WATER AWAY FROM WORK SITE DURING CONSTRUCTION. ENSURE DITCH WATER AND SURFACE RUNOFF FROM THE ROAD DOES NOT FLOW DIRECTLY INTO THE STREAM. INSTALL CROSS DRAIN CULVERTS ON THE APPROACHES AND CONSTRUCT SUMPS AS REQUIRED.

PARTIAL MATERIALS LIST	
QTY	ITEM DESCRIPTION
1	ROLL NON-WOVEN GEOTEXTILE: MIRAFI 180N OR EQUIVALENT
7m ³	LEVELING COURSE (SANDY GRAVEL OR 19mm CLEAR CRUSH) - CRUSH RECOMMENDED WHERE WATER EXPECTED IN FOOTING AREA
4	0.2m X 1.5m X 4.6m (15') PRECAST CONCRETE CONSTRUCTION PADS
12	STD CONCRETE BLOCKS (INTERLOCKING): 0.75mX0.75mX1.5m (TYP.)
10	FLAT TOP CONCRETE BLOCKS (INTERLOCKING): 0.75mX0.75mX1.5m (TYP.)
2	TREATED TIMBER SILLS 0.2m X 0.4m X 4.9m (16 ft)
10	STEEL PINS: 25mmØ (1") TO ATTACH SILL TO LOCK BLOCKS
8	LAG BOLTS: 19mmØ (¾") X 200mm TO ATTACH STEEL GIRDERS TO SILL
8	TIMBER BALLAST WALL: 0.15m X 0.3m X 8.5m LENGTH, NUMBER OF TIMBERS CORRESPOND TO 1.25m DEEP STRUCTURE. NUMBER OF TIMBERS WILL VARY BASED ON ACTUAL DEPTH OF STRUCTURE.
30	DECK CLIPS TO ATTACH PANELS TO GIRDERS (6 PER PANEL AS PER STD-EC-020-07)
4	SETS OF CONCRETE NO-POST APPROACH BARRIERS: 600-CRB-H, CTB-1E, CBN-H
4	W-054 SERIES DELINEATORS (2 LEFT, 2 RIGHT)
1	BAG ROADSIDE GRASS SEED MIX
	RIPRAP: SEE SPECIFICATIONS ON SHEET 4

SPECIFICATIONS FOR CONCRETE BLOCKS (INTERLOCKING):

- CONCRETE MUST HAVE A 28 DAY STRENGTH OF 20MPa MINIMUM UNLESS OTHERWISE SPECIFIED.
- BLOCKS SHALL BE CAST MONOLITHICALLY (I.E., NO COLD JOINTS ALLOWED).
- THE FINISH SHALL MEET CLASS 1.
- CLASS 1 - CLASS 1 FINISH IS THE BASIC FINISH TO BE PRODUCED ON ALL FORMED SURFACES NOT EXPOSED TO VIEW UNLESS A BETTER FINISH IS SPECIFIED OR REQUIRED BY THE DRAWINGS OR SPECIAL PROVISIONS.
 - IN ORDER TO PRODUCE A CLASS 1 FINISH, THE FORMWORK SHALL BE MORTAR TIGHT. PANEL MARKS AND TEXTURE ARE OF NO IMPORTANCE.
 - ALL TIES, BOLTS, NAILS AND OTHER METAL SPECIFICALLY REQUIRED FOR CONSTRUCTION PURPOSES SHALL BE REMOVED OR CUT BACK TO A DEPTH OF 50mm FROM THE SURFACES OF THE CONCRETE AND THE RESULTING HOLES FILLED.
 - NO DRY TIES SHALL BE PERMITTED; FORM TIE RODS SHALL REMAIN EMBEDDED AND TERMINATE NOT LESS THAN 50mm FROM THE FORMED FACE OF THE CONCRETE. REMOVABLE EMBEDDED FASTENERS ON THE ENDS OF THE RODS SHALL BE SUCH AS TO LEAVE HOLES OF A REGULAR SHAPE FOR REAMING AND FILLING.
 - HONEYCOMBS AND VOIDS OVER 500mm² IN AREA SHALL BE FILLED.
- BLOCK SIZE MUST BE 1500x750x750mm.
- DIMENSIONAL TOLERANCE MUST BE ± 20mm FOR LENGTH, WIDTH AND HEIGHT AND THE BLOCKS SHALL BE REASONABLY SQUARE, WITH THE DIAGONALS WITHIN A TOLERANCE OF ± 15mm OF EACH OTHER.
- TOP AND BOTTOM SURFACES MUST BE FLAT TO A TOLERANCE OF ± 3mm UNDER A 600mm STRAIGHT EDGE.
- CONCRETE SHALL BE AIR ENTRAINED 4-7% TO PROTECT THE SURFACE FROM FREEZE THAW DEGRADATION.
- EACH BLOCK MUST CONTAIN A SATISFACTORY EMBEDDED LIFTING DEVICE.
- EDGES SHALL BE CHAMFERED.



DWG No:2052-1-SITE 125179-002

SHEET: 2 OF 6

DESIGN BY: JUSTIN BEVERIDGE, P.ENG.
 DESIGN DATE: SEPTEMBER 4, 2020
 REVIEWED BY: PAUL MYSAK, P.ENG
 DRAWN BY: TODD FORBES
 SITE VISIT: ONSITE ENGINEERING LTD.
 SITE VISIT DATES: AUGUST 18, 2020
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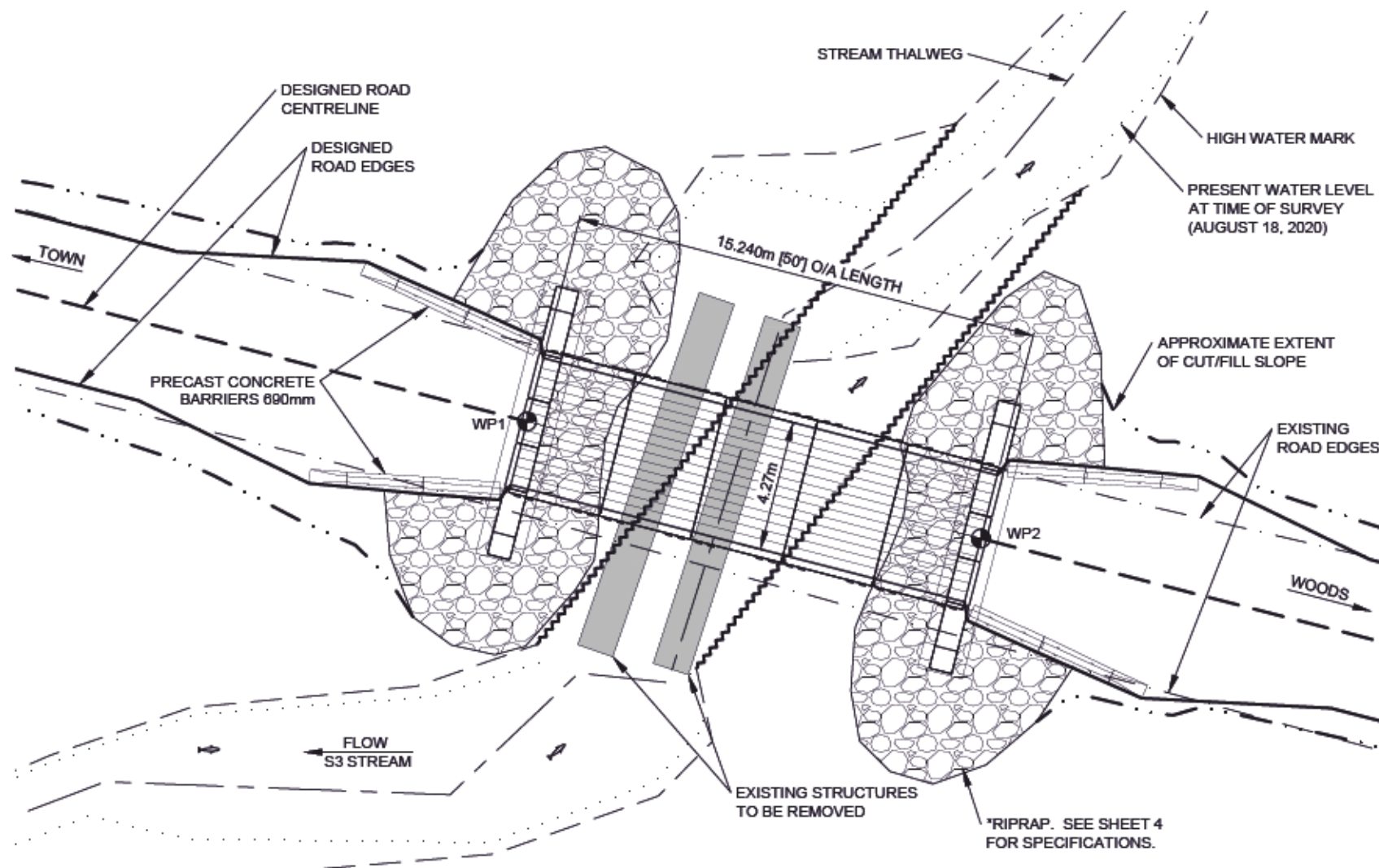
PROPOSED PERMANENT 15.240m [50'] O/A LENGTH STEEL GIRDER WITH MODULAR TIMBER DECK BRIDGE FOR: CHUCHINK-MESSINKA FSR AT 12km SITE: 125179 (121° 54' 42" N , 54° 37' 08" W)

SEAL OF B.C. P.ENG.

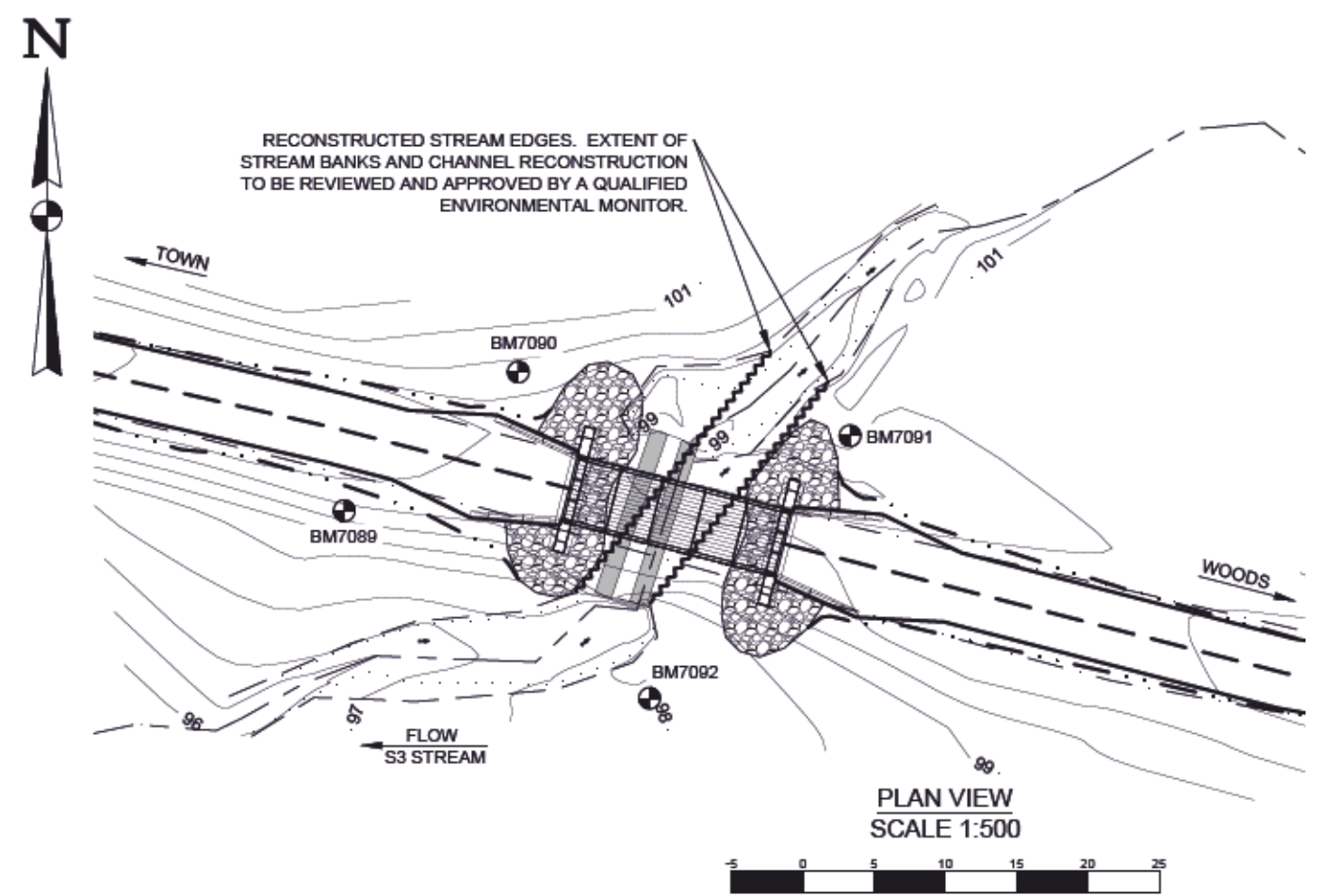
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PLAN VIEW
SCALE 1:200



PLAN VIEW
SCALE 1:500

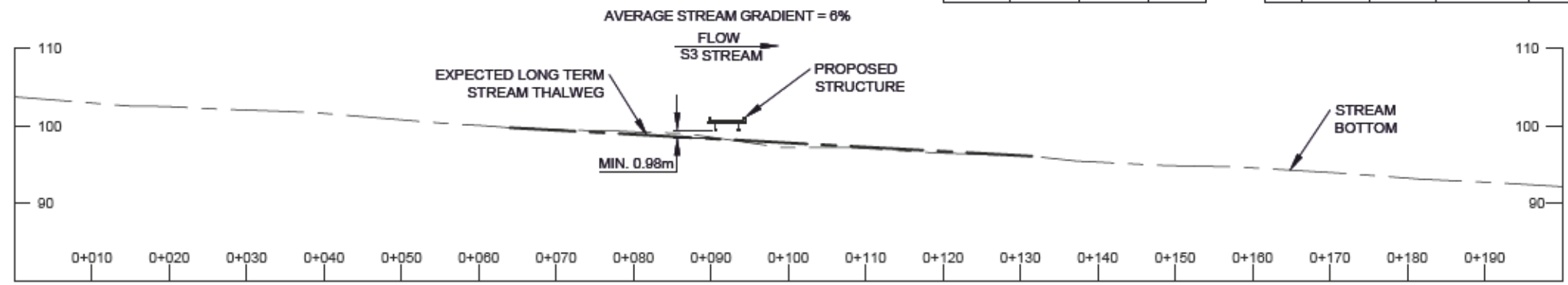


WORKPOINTS ARE LOCATED AT UNDERSIDE ENDS OF STEEL GIRDERS.

ELEVATIONS SHOWN HAVE AN ARBITRARY DATUM AND SHOULD ONLY BE USED TO ESTABLISH RELATIVE ELEVATION WITHIN THE CROSSING FOR CONSTRUCTION PURPOSES.

WP	N	E	ELEV
WP1	5002.47	2995.99	99.45
WP2	4998.66	3010.75	99.45
BM7089	5000.95	2980.04	99.83
BM7090	5010.69	2992.26	100.63
BM7091	5006.21	3015.55	100.67
BM7092	4987.79	3001.47	98.29

WORKPOINT LOCATION TABLE				
WP	OC	BS	ANG R (deg ' ")	HD (m)
1	BM7089	BM7090	33° 08' 28"	16.02
	BM7090	BM7091	54° 39' 55"	9.03
	BM7091	BM7092	41° 47' 55"	19.91
	BM7092	BM7089	37° 59' 04"	15.87
2	BM7089	BM7090	42° 49' 05"	30.79
	BM7090	BM7091	22° 08' 44"	22.06
	BM7091	BM7092	355° 04' 37"	8.94
	BM7092	BM7089	98° 54' 07"	14.30



STREAM PROFILE VIEW
SCALE 1:750



CAUTION: DRAWING SCALE MAY BE DISTORTED WITH PRINTING. INTENDED TO BE PRINTED ON 11"X17" PAPER.

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IN NORTHERN BRITISH COLUMBIA

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PROPOSED PERMANENT 15.240m [50'] O/A LENGTH STEEL GIRDER WITH MODULAR TIMBER DECK BRIDGE FOR: CHUCHINK-MESSINKA FSR AT 12km
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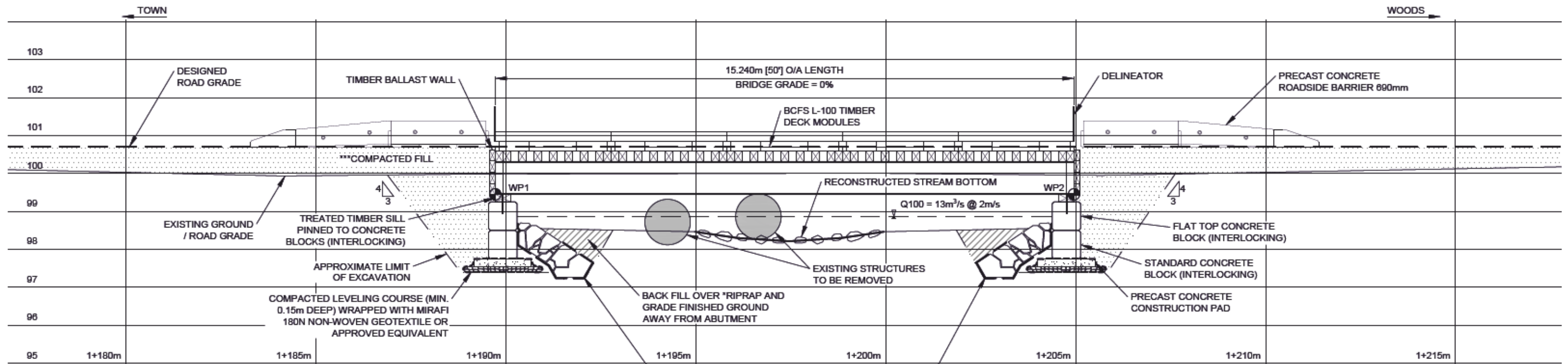
DWG No: 2052-1-SITE 125179-003

SHEET: 3 OF 6

DESIGN BY: JUSTIN BEVERIDGE, P.ENG.
DESIGN DATE: SEPTEMBER 4, 2020
REVIEWED BY: PAUL MYSAK, P.ENG
DRAWN BY: TODD FORBES
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DESIGNED ROAD EDGES	—————	HIGH WATER MARK	———
DESIGNED ROAD CENTRELINE	———	STREAM THALWEG	———
APPROXIMATE EXTENT OF CUT/FILL SLOPE	—— · ——	PRESENT WATER LEVEL	·····
EXISTING ROAD EDGES	- - - - -	RECONSTRUCTED STREAM BANK	~~~~~
BENCH MARK	⊕ BM1	WORKPOINT	⊕ WP1



KEY *RIPRAP TO ELEVATION SHOWN. RIPRAP TO SERVE AS PROTECTION OF FOUNDATION FROM EROSION.

PLACE RIPRAP ON STRIPPED OR EXCAVATED GROUND DIRECTLY IN FRONT OF THE PROPOSED CONSTRUCTION PAD. REMOVE ALL ORGANICS AND LOOSE MATERIAL FROM THE EXCAVATION BOTTOM AND PLACE ROCK. EXPECT UNDERLYING SOIL TO BE **COMPACT ROAD FILL. RIPRAP IS TO BE CAREFULLY PLACED TO CREATE AN INTERLOCKING SURFACE. SEE THIS SHEET FOR SPECIFICATIONS.

ELEVATION VIEW
SCALE 1:100



*RIPRAP: CLEAN ANGULAR ROCK

CLASS 250kg RIPRAP
ROCK GRADATION
PERCENT SMALLER THAN GIVEN
ROCK MASS kg(mm)
15% 25(260)
50% 250(565)
85% 750(815)

NOMINAL THICKNESS OF RIPRAP
1000mm



ALL ROCK TO BE PLACED TO MAXIMIZE INTERLOCKING BETWEEN PIECES. ALL ROCK TO BE UNDERLAIN WITH MIRAFI 180N OR APPROVED EQUIVALENT NON-WOVEN GEOTEXTILE. APPROXIMATELY 200m² OF RIPRAP REQUIRED.

**SOIL DENSITY	
VERY LOOSE	EASILY EXCAVATED WITH A SPADE
LOOSE	SOME RESISTANCE TO SPADE
COMPACT	CONSIDERABLE RESISTANCE TO SPADE
DENSE	REQUIRES PICK FOR EXCAVATION
VERY DENSE	HIGH RESISTANCE TO PICK

***COMPACTED FILL
GRANULAR FILL TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY.

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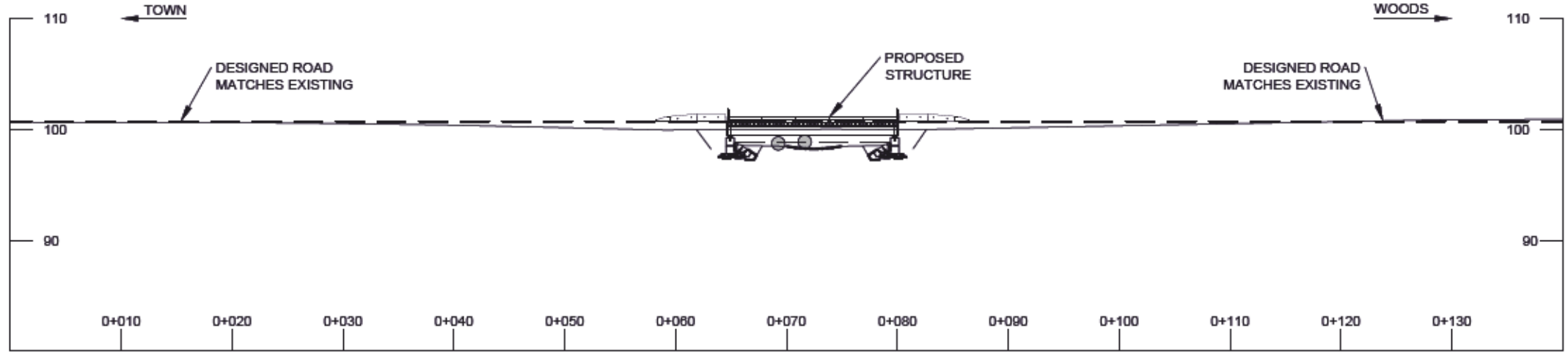
DWG No: 2052-1-SITE 125179-004

SHEET: 4 OF 6

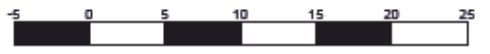
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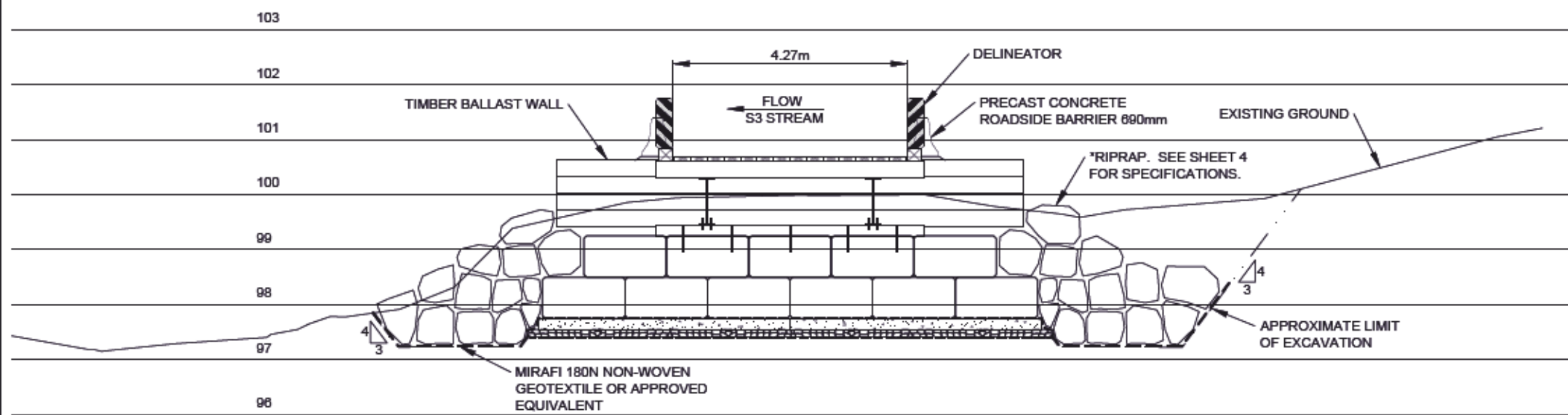
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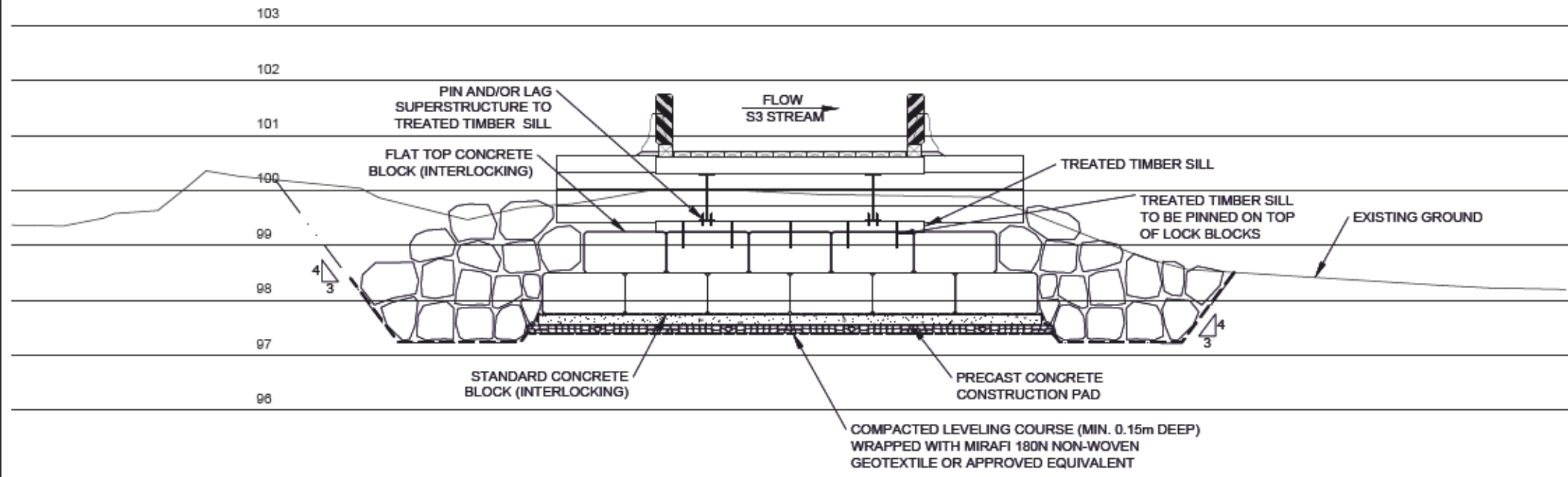
ROAD PROFILE VIEW
SCALE 1:500



DESIGNED ROAD GRADE — — — — — MIRAFI 180N GEOTEXTILE (OR APPROVED EQUIVALENT) — — — — —
APPROXIMATE LIMIT OF EXCAVATION — WORKPOINT WP1
HIGH WATER LEVEL — — — — —



TOWN ABUTMENT CROSS SECTION
SCALE 1:100



WOODS ABUTMENT CROSS SECTION
SCALE 1:100



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DWG No: 2052-1-SITE 125179-005

SHEET: 5 OF 6

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2020-09-04

APPROXIMATE LIMIT OF EXCAVATION ———— MIRAF1 180N GEOTEXTILE (OR APPROVED EQUIVALENT) - - - - -



PHOTO #1 - FROM CROSSING LOOKING TO TOWN



PHOTO #2 - FROM CROSSING LOOKING TO WOODS



PHOTO #3 - FROM UPSTREAM LOOKING TO CROSSING



PHOTO #4 - FROM CROSSING LOOKING DOWNSTREAM

PREPARED FOR:



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DWG No:2052-1-SITE 125179-006

SHEET: 6 OF 6

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