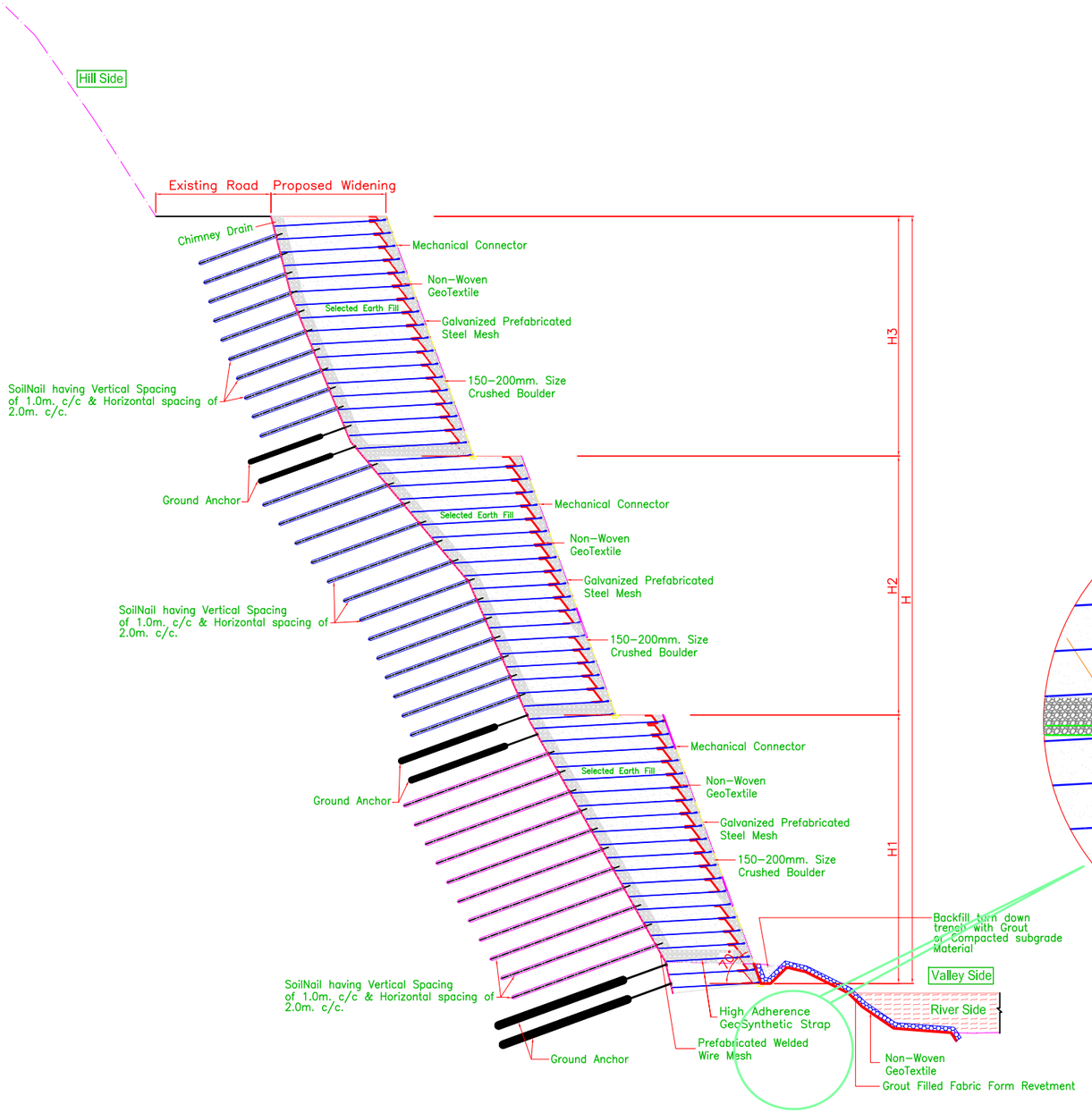
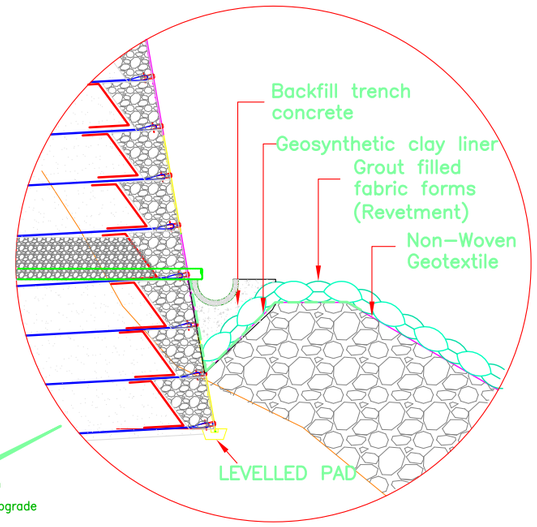


Reinforced Soil Composite System
(Typical Cross-section 1)

(TABLE -3) MATERIAL SPECIFICATION OF SOIL NAIL

Nominal diameter	Grade	Cross section (mm^2)	Yied load (kN)	Ultimate load (kN)	Elongation (%)
22	St 670/800 (grade 97)	375	251	300	7
25	St 670/800 (grade 97)	491	329	393	7
28	St 670/800 (grade 97)	616	413	493	7
30	St 670/800 (grade 97)	707	474	566	7



(TABLE -2) PROPERTIES OF GROUT FILLED FABRIC FORM

	Test Method	Units	Values
PHYSICAL PROPERTIES [1, 2]			
Composition of Yarns			Polyester
Mass Per Unit Area (double-layer)	AS D 5261	g/m^2	500
Thickness	AS D 5199	Mm	0.40
Mill Width		M	2.13
MECHANICAL PROPERTIES [1, 2]			
Wide-Width Strip Tensile Strength	AS D 4595		
Machine Direction		kN/m	50
Cross Machine Direction		kN/m	60
Elongation at Break	AS D 4595		
Machine Direction		%	8
Cross Machine Direction		%	8
Grab Tensile Strength	AS D 4632		
Machine Direction		N	1395
Cross Machine Direction		N	1395
Elongation at Break	AS D 4632		
Machine Direction		%	25
Cross Machine Direction		%	20
Trapezoidal Tear Strength	AS D 4533		
Machine Direction		N	460
Cross Machine Direction		N	600
CBR Puncture Strength	AS D 6241	N	5450
Mullen Burst Strength	AS D 3786 (Mod.)	kg/cm^2	40
HYDRAULIC PROPERTIES 1, 3			
Apparent Opening Size (AOS)	AS D 4751	mm	0.30-0.80
Permittivity	AS D 4491	sec^{-1}	0.40-0.55
Flow Rate	AS D 4491	$l/min/m^2$	1200-1625

PROPERTIES OF PERMANENT GROUND ANCHORS:-

A.) Grade & Properties of Tendon Materials

HTS wire in accordance with : EN-10138-3/ASTM-A416-06
Diameter of HTS wire - 15.7mmØ
Nominal C/S Area - 150mm^2
Ultimate Breaking Load - 279KN
Specified 0.1% Proof Load - 246KN
Maximum Relaxation - 2.5%
Ultimate Tensile Strength - 1860N/mm^2
Brands : TATA, USHA MARTIN

B.) Details of Triple Layer of Corrosion Protection

Layer-01 : Epoxy Paint for the entire length of Tendon
Layer-02 : Grease for Free Length, Cement Grout with Quartzite Sand for Fixed Length
Layer-03 : HDPE Individual Sleeve & Outer Corrugated HDPE Duct In Free Length Cement Grout with Corrugated HDPE Duct In Fixed Length

C.) Grout, Cement, Additive details

Grout properties in accordance with BSEN-445-1997, BSEN-445-1997 & BSEN-447-1997
Grade of Cement - OPC-43 Grade
Additive - Master Flow-150 (BASF), CEBEX-100 (FOSROC) and Intrplast-NN(SIKA)
Water cement ratio : 0.36 TO 0.40
Dosage of additive : 0.4% TO 0.5% (or as per manufacturer recommendation)
Temperature : 10°C TO 25°C
Fluidity : 11 to 20 Seconds (Flow Cone Apparatus)
Bleeding : 2% to 4% after 3 hours and 0% after 24 hours
Volume Change : (-)1% to (+)5%
Compressive Strength : 20 MPA after 3 days, 30 MPA After 7 days and 35 MPA after 28 days

THE DRAWING IS FOR REFERENCE ONLY. CONTRACTOR SHALL SOURCE THE TECHNOLOGY /SYSTEM FROM SPECIALIZED TECHNOLOGY PROVIDER ADOPTING MATERIALS OF GIVEN SPECIFICATION OR HIGHER. CONTRACTOR TO SUBMIT DETAILED WORK METHODOLOGY, SPECIALIZED AGENCY CREDENTIALS FOR NHIDCL APPROVAL PRIOR TO WORK.

THE SUITABILITY, SUSTAINABILITY, AND STABILITY OF THE DESIGN AND STRUCTURES ARE TO BE CERTIFIED BY INDIAN INSTITUTE OF TECHNOLOGY (DELHI/KANPUR/MUMBAI/KHARAGPUR/ROORKEE) BEFORE THE COMMENCEMENT OF WORK.

REVISIONS

REV	DATE	DRN	CHK	AMENDMENTS

CLIENT:

National Highways & Infrastructure Development Corporation Ltd.

PROJECT NO. ----	SCALE	SHEET SIZE A3	
DRAWN	CHECKED BY: INITIAL / FINAL	APPROVED --	DATE 28/12/2016
DRAWING NO. NHIDCL/02	SHEET No. 02/02	REV.	
DRAWING STATUS: ----			

PROJECT: ----

STRUCTURE: ----

TITLE: SIKKIM-RHENOK TO PAKYONG