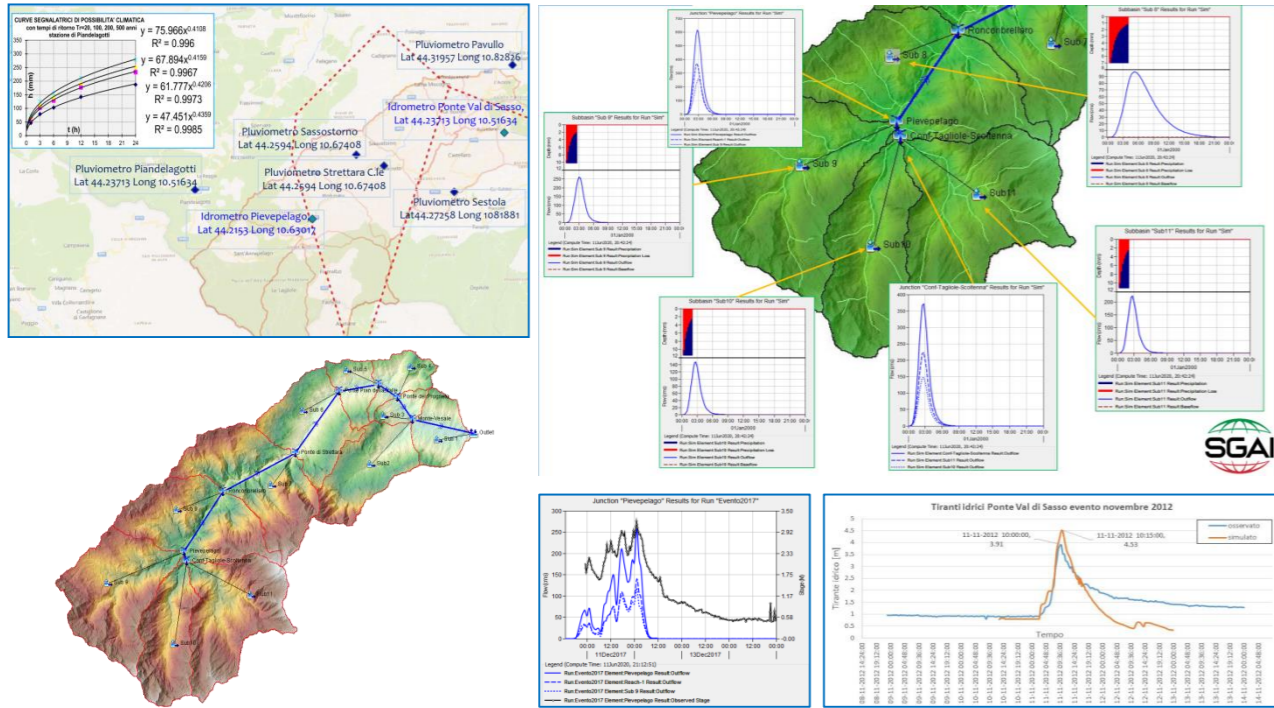


FEATURE OF TECHNICAL SERVICE

Subject	Preliminary, definitive and executive design for the intervention of hydraulic water regulation and consolidation of the banks in landslide along the Scoltenna creek	
Carried out by	SGAI S.r.l. di E. Forlani & C.	
Client	Emilia Romagna region	
Service length	2020	
Value of works	€ 441'394,85	
Categories value	D.02	€441'394,85

Rainfall-runoff model



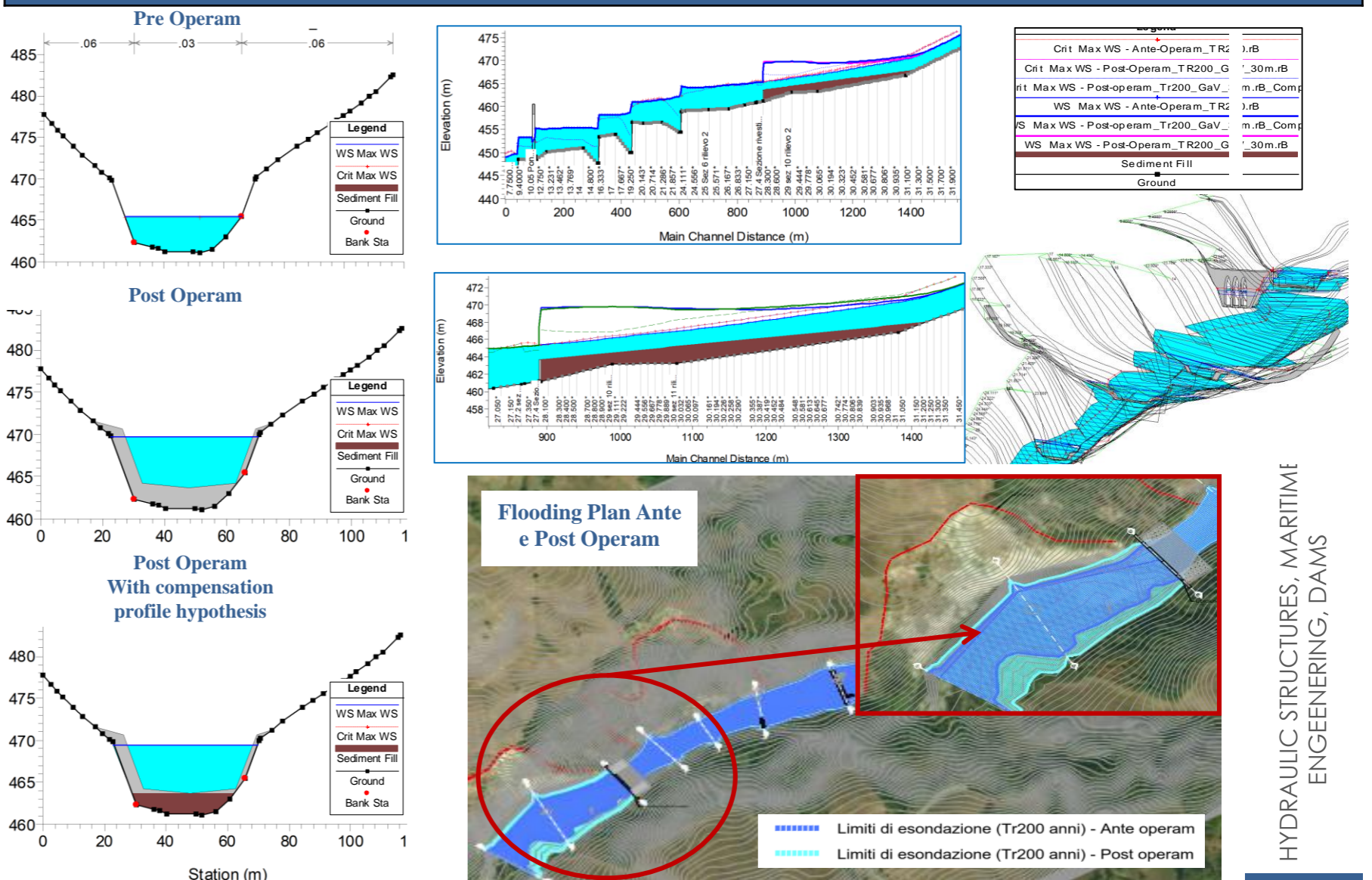
Hydraulic regimentation of the stream Scoltenna – Description

Scoltenna stream is the main tributary of the Panaro River. The section covered by the project is located within the Municipality of Lama Mocogno (MO), upstream of the Pian della Valle bridge, where there is an instability that affected the basal portions of the Lama Mocogno landslide body. The planned works have the purpose of reducing the hydrogeological risk by improving the hydraulic regulation and the stability of the banks of the stream in a section characterized by landslides in progress due to bank erosion.

To support the preliminary design, various inspections and geological surveys were carried out which revealed 3 areas considered to be at the highest hydrogeological risk. After studying the possible solutions, also in terms of costs to be incurred, it was decided to intervene in the “Pian della Valle area”. The hydrological study made it possible to identify the flow hydrograms necessary for the subsequent hydraulic model. The rainfall-runoff model was created with the HEC-HMS software. The Ante and Post Operam hydraulic models have been implemented with the HEC-RAS software with unsteady flow and one-dimensional analysis. The final project included: the restoration of a ripped weir to reduce the slope of the stream, the lining of the riverbed and the banks with cyclopean boulders downstream of the new weir and the construction of a drainage trench for the control of sub-surface waters upstream of the landslide body.



Hydraulic models



Weir checks

In the final design phase of the weir, various checks were carried out: stability check of the temporary excavations that will precede the construction of the bank defense work, checks on the ultimate limit states with the STAP software with the limit equilibrium method (simplified Bishop), siphoning test carried out considering the Bligh-Lane empirical criterion, estimate of the correction slope carried out using Shields' treatment, Thiery's formula and Valentini's formula, structural verifications carried out using a semiprobabilistic method at limit states through the MAX program 15.0 of Aztec Informatica, in addition, overturning, sliding, limit load and global stability checks were carried out.

