its Engineering Company

HYDRAULIC & WATER MANAGEMENT DEPARTMENT

Brochure

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The Department

The historical era we live in requires more effort in water resources management due the increase of extreme weather events.
In this context is where ITS Hydraulic department fits in: hydraulic studies and design of reclamation and irrigation works, aqueduct and sewer networks, storm water and wastewater disposal system, and also watercourses and hydraulic invariance works.
The 30 years experience of ITS's Hydraulic engineering team allows us to find the best solution by ensuring mitigation and environmental and landscape enhancement.

Services

01 Territory Analysis (GIS)

ITS Hydraulic analyzes the territory from a cartographic perspective, carrying out territorial data processing. These analyses enable the definition of the territory's characteristics from topographic, morphological hydraulic, geological, etc., perspectives, as well in terms of criticality and constraints.

02 Inspections and Surveys

Thanks to the experience gained in mountain and alpine environment, the technicians can access the most challenging places. In addition to the latest equipment, the team uses drones and the most advanced mountaineering techniques, also thanks to their qualification for the rope access work.

03 Monitoring

The department can offer the most modern techniques of monitoring in the field of hydro-geological instability, such techniques are very useful in the study of landslide and general gravitational movements but are applicable to any hydro-geological instability. The combination of monitoring and the combination of detailed meteorological models makes it possible to create predictive models for forecasting sudden phenomena such as floods and debris flow.

04 Numerical Modelling

The usage of the most advanced tools for the numerical modelling of natural phenomena such as floods and the inundation of streams, study of tides and wave motion. For the characterization of risk and danger, related to hydro-geological instability phenomena, one-and two-dimensional modeling are carried out.

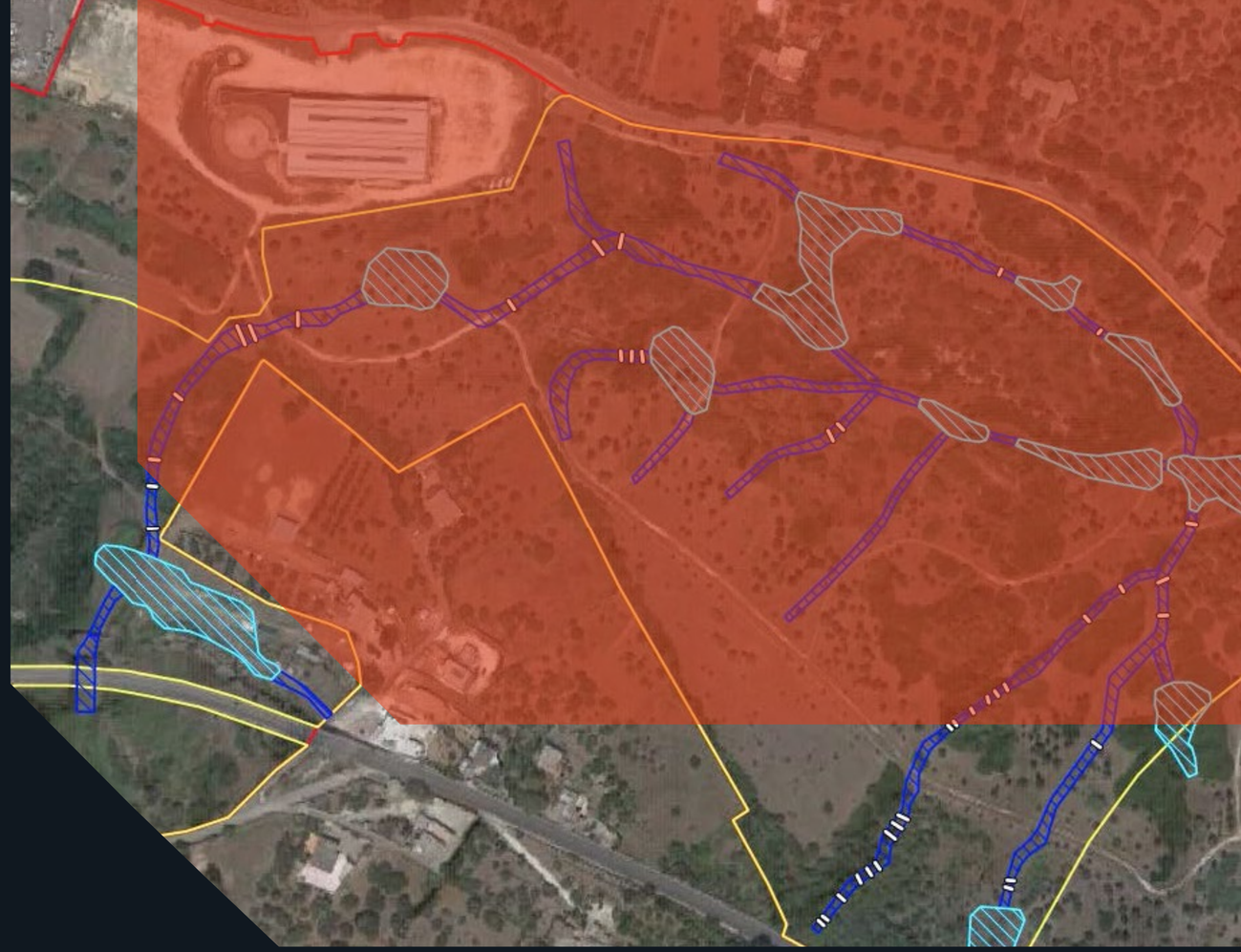
05 Design

The departments of the company work with a close cooperation, which makes it possible to define the best design solution from all points of view, such as structural efficiency, landscape, integration, effectiveness of the effects on the event to counter, and the durability.

06 Environment Assessment

ITS Hydraulic can provide engineering services in the field of environmental assessment such as EIA (Environmental Impact Assessment), SEA (Strategic Environmental Assessment), VINCA (Environmental Incidence Assessment), landscape reports, etc., These assessments are fundamental of the approval of the projects: a multidisciplinary approach is the only way to describe all the facets that characterize a project from the point of view of its impact on the environment.

Our Projects



New Water Intake from the Boite Stream

Strategic Hydraulic Infrastructure to Enhance Snowmaking for the Socrepes–Pocol–Tofana Area, in Preparation for the Milano Cortina 2026 Winter Olympics

As part of the infrastructure works connected to the XXV Winter Olympic Games Milano Cortina 2026, our team developed the design of a new water supply system to boost artificial snow production for the Socrepes-Pocol-Tofana ski area in Cortina d'Ampezzo (BL).
The project involved the construction of a temporary water intake on the Boite Stream in the Cadin di Sopra area, and the pumping of water to the "In Po' Drusciè" storage basin through a 3.5 km long underground pressurized pipeline.
The system ensures the water supply needed for snow production on Olympic slopes, while protecting both the water body and the surrounding high-value natural environment.
All works were designed in full compliance with current environmental regulations, landscape protection requirements, and management plans for both UNESCO-designated areas and the Dolomiti d'Ampezzo Natural Park, ensuring the highest level of sustainability.

Location:	Veneto, ITALY
Client:	Infrastrutture Milano Cortina 2020 - 2026
Year:	2025
Work amount:	€3,575,934.46
Categories:	D.04, IA.03, S.03
Services provided:	Technical and economic feasibility study

Lenzino Bridge

Construction work of the definitive bridge over the Trebbia River in Municipality of Corte Brugnatella

After the collapse of the Lenzino Bridge on October 3, 2020 – caused by the failure of the central pier during an exceptional flood of the Trebbia River – hydrologic and hydraulic modelling became a key element in the design of the new bridge on State Road SS45.
Discharge estimates were obtained through hydrological analysis, while the hydrodynamic and morphological behaviour of the Trebbia River was simulated – for the study area – using both two-dimensional mobile-bed and fixed-bed models.

The models provided maximum values for scour depth, water levels, and velocities under different design scenarios:

- Current state, with the temporary bridge and both piers of the collapsed bridge;
- Transition phase, with the new bridge, temporary bridge, and both old piers;
- Final design state, with the new bridge and the restored pier (temporary bridge and right-bank pier removed).

These scenarios allowed for direct comparison and identification of the most critical condition, which guided the design of all structures.
Particular attention was paid to the interaction between the new and old bridge (subject to heritage protection) and to the removal of the damaged weir.
Structural stability was assessed by combining general scour from mobile-bed modelling with local scour, calculated using empirical formulas from the literature.

Location:	Emilia Romagna, ITALY
Client:	ANAS S.p.A.
Year:	2020 - 2023
Work amount:	€25.000.000,00
Categories:	D.02, S.04, S.05, V.02
Services provided:	Final and executive design

Parco Ortolini

Redevelopment of the Ortolini Park complex

Parco Ortolini, a green area of 33 hectares, is in the countryside of the municipality of Martina Franca (TA) in the area northeast of the town, in the middle of the Itria Valley and in the southern part of the Murge plateau. At the hydraulic level, the park is not affected by actual watercourses, but by so-called episodic watercourses that form during rain events. The direction of runoff of such waters along the park follows a general trend from southwest to northeast, where there is a more depressed area where a sinkhole has been identified a doline (natural karst cavity) where the waters, at least partially, are "swallowed" into the groundwater system.

In this context, hydraulic design has set itself the goal of regimentation of stormwater, solving the problems of uncontrolled erosion that accompany them. In addition, the design solution allows at least partial absorption of part of the flood flows by improving the hydraulic conditions downstream of the park itself.

It is planned to create a "network of streams" that will allow to collect runoff water in a safe and orderly manner, transferring it to some temporary expansion areas that will allow at the same time to laminate flood flows reaching the swale, allow slow surface infiltration with sediment deposition, collect water from first rain and create areas with landscaping and biodiversity enhancement purposes.

Location:	Apulia, ITALY
Client:	Municipality of Martina Franca
Year:	2021 - 2022
Work amount:	€1.020.000,00
Categories:	D.02, P.01
Services provided:	Final and executive design

Parco della Pace

Construction of a new urban park on the site of the former Dal Molin airport in Vicenza

The Parco della Pace on the site of the former Dal Molin airport in Vicenza, planned as a compensation work following the construction of the U.S. military base on the remaining part of the former airport, is, with its 60 hectares of land, a real metropolitan park.
The park is envisioned as a large plain, shaped by a landscape of water and relief, forests, and grasslands. In the event of heavy and prolonged rainfall, the hydraulic network of the park acts as a rolling basin for precipitated volumes, allowing a constant and regulated runoff at the park's outlet to the final discharge.
The works carried out thus have a dual value: landscape, as a significant component in the theme of the park, and hydraulic, in that they are necessary to ensure the drainage and lamination of project rainfall. ITS was responsible for the hydraulic design of the entire complex of canals, guard ditches, drainage flow regulators and water mirrors that made it possible to guarantee the flooding of the approximately 1300 cu m/ha derived from the hydrological analyses conducted.

Location:	Veneto, ITALY
Client:	Municipality of Vicenza
Year:	2018 - 2022
Work amount:	€6.000.000,00
Categories:	D.02, S.05, E.20, E.19, E.21, AI.01, V.02
Services provided:	Final and executive design, construction supervision, coordination during design and executive phases

Dosolo-Guastalla Bridge

Emergency interventions to secure the Provincial connecting road infrastructure insisting on the Po River - bridge between the municipalities of Dosolo (MN) and Guastalla

This hydraulic study is part of the project also prepared by ITS of static improvement of the deck of the Dosolo-Guastalla bridge over the Po River by applying additional prestressing by means of external nonadherence.
A dedicated hydraulic analysis was carried out that aims to determine the magnitudes hydraulics, fundamental to the verification of hydraulic compatibility of the bridge undergoing intervention, in the comparisons of hydraulic frankness, thrust and undermining. Thus, the modeling involved a river stretch of about 20 km, and the model has been calibrated and validated using official PAI data. The design flow rate was found to be of the order of 13'700 cu m/s.
The lidar survey used for modeling was supplemented by a bathymetric survey for a section of the riverbed extended approximately 200 m downstream and 300 m upstream of the bridge, which allowed for a more accurate determination of the plani-altimetric course of the bottom of the riverbed and identify any undermining phenomena taking place on the structures in the riverbed.

Location:	Lombardy - Emilia-Romagna, ITALY
Client:	Provinces of Reggio Emilia e Mantua
Year:	2021 - ongoing
Work amount:	€4.5000.000,00
Categories:	D.02, S.03, S.04, V.02
Services provided:	Final and executive design, geo-gnostic surveys, load tests

Tevere River

Variant to the settlement of Monterotondo Scalo- 2nd phase

The hydraulic study conducted was commissioned for the construction of the bypass for the "Salaria road, near the town of Monterotondo.
It is one of the implementations of the broader planning of the Tevere Media Valle, aimed at the hydraulic safety of these territories, while respecting the legitimate urban development needs of the small towns within them and the hydraulic preservation of the metropolitan area of Rome.
The second part of the "Monterotondo Scalo Variant" project is divided in 2 phases, the first one is the construction of a bypass road around Monterotondo on an embankment prepared and built to become a levee, when all the complementary hydraulic works of active and passive defense works by Lazio Region will have been done.
For this reason, all the arrangements were made from the design necessary so that the road embankment would have the mechanical and hydraulic characteristics to fulfill the function of embankment, verifying that until the works complementary works are not realized it will be transparent with respect to the flood of the Tevere, so as not to aggravate conditions downstream and thus in the metropolitan area of Rome.
The analyses carried out involved two-dimensional modeling of the Tevere river for a total stretch of about 15km, for the pre- and post- intervention scenarios.

Location:	Lazio, ITALY
Client:	Sintagma S.r.l.
Year:	2021
Work amount:	-
Categories:	D.02
Services provided:	Hydraulic study

Piave River

Diaphragm works in the left embankment body of the Piave River

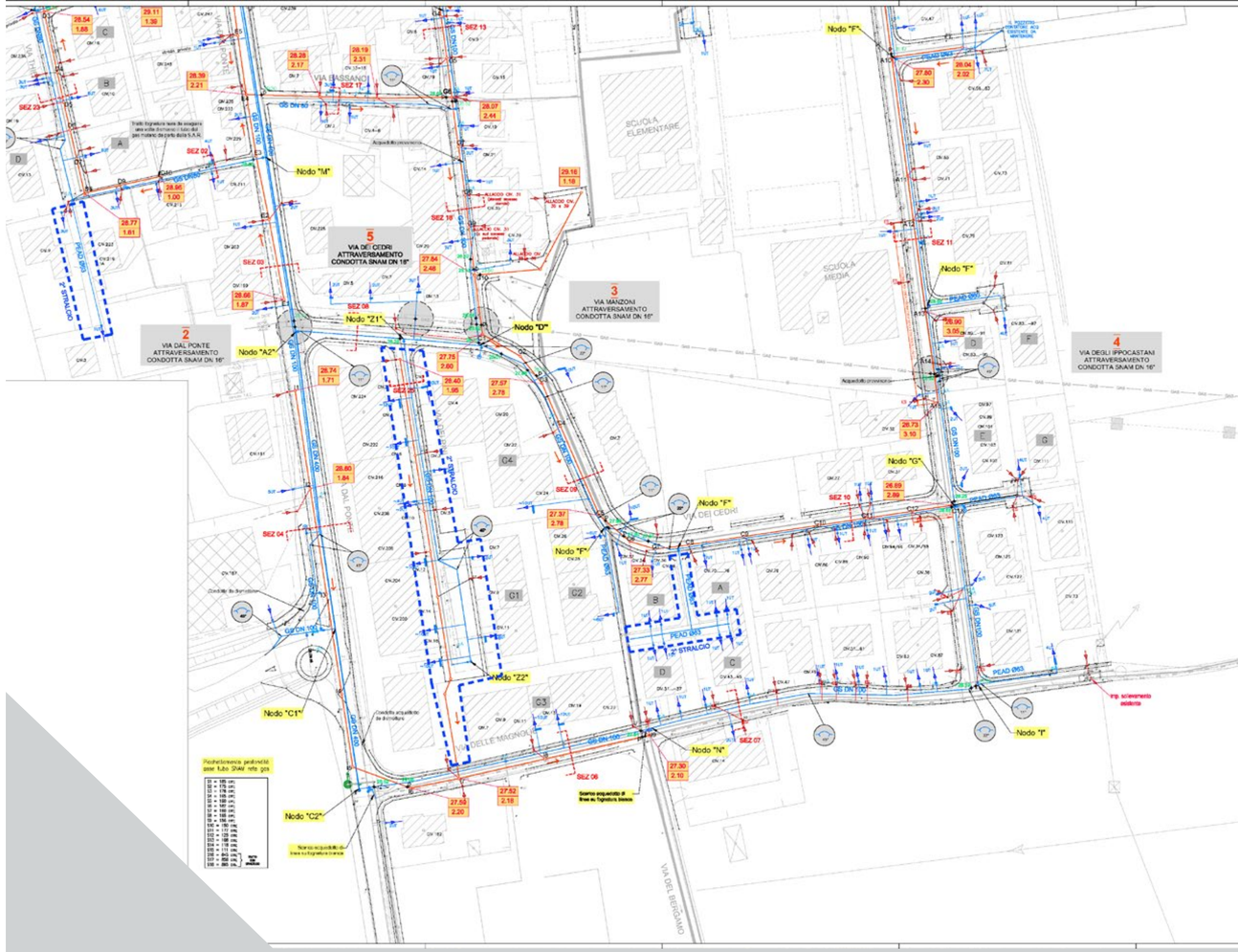
The intervention included the construction of an embankment diaphragm wall in the section of left embankment from the access traffic circle to the road bridge in the municipality of Ponte di Piave southward to approximately the municipal border with Salgareda. The intervention has the purpose of eliminating the possibility of siphoning or seepage phenomena in the event of a flooding of the Piave River. Based on the investigations carried out, the possible hydraulic filtration motions that can be established in the embankment and sub-embankment during flood events. Stability verification was carried out using Jambu's method, considering surfaces of circular shape while for the phenomenon of siphoning is analyzed the area most critical to this phenomenon, located at the foot of the embankment on the countryside, in presence or absence of the planned impermeable diaphragm wall. Subsequently, a proceeded to the verification of infiltration. The diaphragm was constructed by means of the jet-grouting technique, a design solution of usual application in cases similar ones. Among the particularities of the intervention, of significant importance is the interference of the construction site with the local road system, and more specifically with the provincial road SP 34 "Sinistra Piave," as an artery of fundamental importance for the connection road to the maritime area of Jesolo.

Location:	Veneto, ITALY
Client:	Veneto Region
Year:	2019 - 2021
Work amount:	€1.800.000,00
Categories:	D.02, S.05
Services provided:	Final and executive design, coordination during design and execution phases

Marola Sewer and Aqueduct

Separation of the sewerage network and upgrading of the aqueduct in the locality of Marola in the municipality of Torri di Quartesolo

The project includes the construction of the sewerage network, the rehabilitation of the gas network methane, and the complete reconstruction of the aqueduct network consisting of pipelines made of steel, fibronit and pvc, subject to numerous ruptures, which have involved several repairs works in recent years.
As for the aqueduct network, about 4,200 m of piping, accompanied by the remaking of about no. 227 connections, complete with manholes meter.
A specific by-pass system was provided for the control/management of flow rates upstream and downstream complete with operating equipment such as vents, gate valves, non-return valves and flow measurement system. At the crossings and side streets there are maneuvering devices such that lines can be sectioned off during maintenance operations. To allow the filling and emptying of the pipelines in the highest ground level, near the Bridge with the Tesina, a dual-purpose vent is positioned, while at the lowest points in Via Magnolias and via Dal Ponte Sud, line drains have been provided.



Location:	Veneto, ITALY
Client:	Viacqua S.p.A.
Year:	2018 - 2019
Work amount:	€3.650.000,00
Categories:	D.05
Services provided:	Preliminary, final and executive design, safety coordination during design and execution phases

Povolaro Sewer

Separation of the sewerage system in the locality of Povolaro in the municipality of Dueville

The territory of the Municipality of Dueville was served by a sewage collection system of a predominantly unitary that discharged into the only municipal sewage treatment plant, periodically showing important inputs of eddy water into the pipelines, a phenomenon that was affected both by the variability of the groundwater level and of the interconnection of the minor hydrographic system with the sewage system.
Faced with this serious environmental situation, the goal was to study a definitive solution that would involve the complete separation of the entire mixed basin afferent Via Redentore and Via Molinetto, so that the ditch present in Via Molinetto could receive only rainwater and, eventually, discharges from the wells and private groundwater drains.
To achieve the goal of separation of black water and storm water, the project included the construction of a new black sewer network serving the built-up area of the hamlet of Povolaro in the Municipality of Dueville. In addition, a lifting plant was designed in Via della Fisca to solve a local problem of delivery to the network and the decommissioning of the two spillways of the original mixed network original mixed network, which delivered overflow water into the local drainage network and which, thanks the separation of the networks by design, have lost their function.

Location:	Veneto, ITALY
Client:	Acque Vicentine
Year:	2015 - 2018
Work amount:	€2.8000.000,00
Categories:	D.05
Services provided:	Preliminary, final and executive design

Lierza River

Lierza River hydraulic risk assessment

The Lierza is a watercourse with a torrential character located in the northern part of the province of Treviso. Following a mournful event, the municipality of Refrontolo has entrusted the hydraulic study of the watercourse to verify its criticality and define hazard scenarios in case of an exceptional event.
The modeling of the hydrodynamic behavior of the waters of the Lierza River was developed, for the stretch limited to the area under study, by means of a computational model two-dimensional (full 2d) finite volume by applying InfoWorks ICM software. The two-dimensional modeling of the watercourse allows to represent with accuracy the propagation of flood waves in the river rod and riparian areas adjoining with the peculiarity of highlighting the behavior of the current in the vicinity of abrupt narrowing/ widening and strong bends. At the same time the representation in two-dimensional terms of the velocity field makes it possible to analyze the evolution of flooding induced by the propagation of flood waves within the examined area and to estimate the erosive capacity of the current.

Location:	Veneto, ITALY
Client:	Municipality of Refrontolo
Year:	2015
Work amount:	-
Categories:	D.02
Services provided:	Hydraulic study

RFI Framework Agreement

Hydrological Studies, Hydraulic Verifications, and Surveys to Improve the Safety and Resilience of the Sicilian Railway Network

Under a framework agreement with RFI – Operational Directorate for Territorial Infrastructures in Palermo, our team is carrying out hydrological studies, topographical surveys, and hydraulic verifications on multiple infrastructures supporting the Sicilian railway network.

The activities under Lot 9 include field surveys, advanced hydraulic modeling, and compatibility assessments with the Flood Risk Management Plans (PGRA) and Hydrogeological Structure Plans (PAI).

The first 17 sites are already in the operational phase, starting with river and structure surveys.

Our goal is to assist RFI in the early identification of hydraulic criticalities, contributing to the climate resilience and safety of railway infrastructures in a complex and vulnerable territory

Location:	Sicily, ITALY
Client:	RFI S.p.A. – DOIT Palermo
Year:	2024 – ongoing
Work amount:	€883,819.42
Categories:	D.02
Services provided:	Hydrological studies, hydraulic modeling, hydraulic compatibility analysis, field surveys

its
Engineering
Company

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