

Depots for public transport

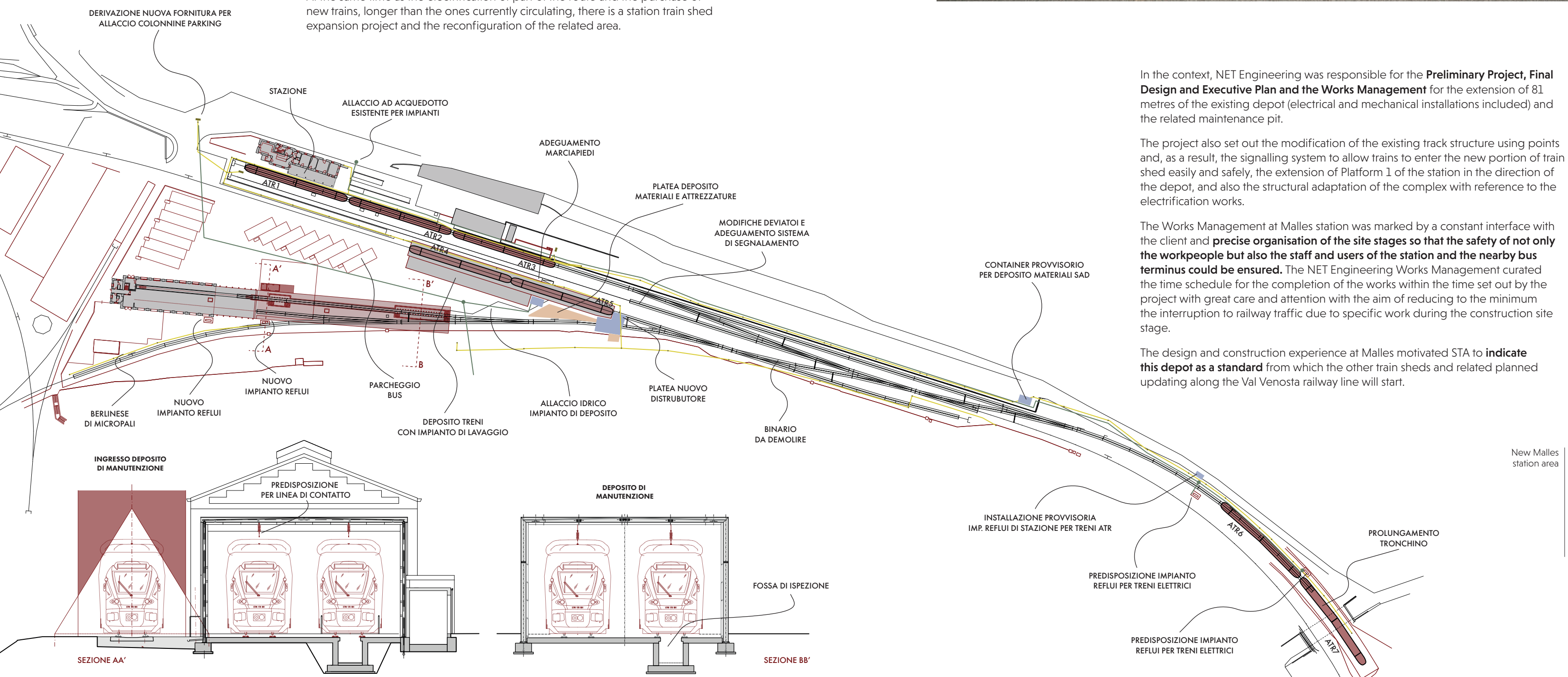
Technological innovation,
engineering excellence and
attention to detail

The Malles railway depot

The Val Venosta, Alto Adige, railway line

The Val Venosta railway line has been involved in an important renovation project by Struture Trasporto Alto Adige S.p.A. (STA) since 2005. The project, preparatory to the more ambitious aim of regional redevelopment of the area, involves the electrification of the line as a priority so that the capacity, number of seats and comfort can be increased.

At the same time as the electrification of part of the route and the purchase of new trains, longer than the ones currently circulating, there is a station train shed expansion project and the reconfiguration of the related area.



In the context, NET Engineering was responsible for the **Preliminary Project, Final Design and Executive Plan and the Works Management** for the extension of 81 metres of the existing depot (electrical and mechanical installations included) and the related maintenance pit.

The project also set out the modification of the existing track structure using points and, as a result, the signalling system to allow trains to enter the new portion of train shed easily and safely, the extension of Platform 1 of the station in the direction of the depot, and also the structural adaptation of the complex with reference to the electrification works.

The Works Management at Malles station was marked by a constant interface with the client and **precise organisation of the site stages so that the safety of not only the workpeople but also the staff and users of the station and the nearby bus terminus could be ensured.** The NET Engineering Works Management curated the time schedule for the completion of the works within the time set out by the project with great care and attention with the aim of reducing to the minimum the interruption to railway traffic due to specific work during the construction site stage.

The design and construction experience at Malles motivated STA to **indicate this depot as a standard** from which the other train sheds and related planned updating along the Val Venosta railway line will start.

New Malles station area

The Segrate-Pioltello railway workshop

The Mercitalia Maintenance, Gruppo FS, industrial building

Planning the renovation of a depot and railway workshop of 21,550 m² is certainly a challenge. It is a greater challenge if the project includes 68,000 m² of external areas, including the land with the railway and service area, and an even greater one if the project concerns a 1930s building and sidings bombed during the Second World War.

NET Engineering was responsible for the **Preliminary Project, Final Design and Executive Plan of the refitting of the architectural, infrastructural, structural and installations layouts of the Segrate-Pioltello (Milan) railway workshop, totally developed using BIM.** The industrial building, conceived and built as a goods warehouse, is undergoing an important modernisation project with the aim of **amending its intended use to a railway carriage maintenance workshop, planning the addition of new services and an upgrade of the production system.**

The renovation project drafted by NET Engineering mainly concerned the **architectural building elements and the reinforcement of the bearer structures of the building with seismic updating and creation of new structures functional to the work** (access ramps, external storage base of wheel sets, creation of internal maintenance pits, etc.).

In addition, the demolition and creation of new building services (mechanical, storm water runoff, fire prevention, electrical and special), the creation of the

external car park and infiltration basin, organisation of the land with the railway and the resolution of potential interferences with the existing sub-services were also planned. NET Engineering's work began with the reconstruction of the state of the work of the area using Laser Scanner, MMS and drones. The data was then imported and processed using BIM software, which enabled integrated co-ordination of the project, simplifying the management of a lot of information and facilitating interaction between the disciplines involved.

In detail, the architectural design brought many production lines implying handling of heavy materials together in the same space with the other functions set out in the building (administrative and operational offices, conference rooms, dressing rooms, canteen, the recreation room, etc.) fully respecting safety regulations.

Structurally speaking, **superficial defects and the specific geometry of the depot and its structure, consisting of hundreds of columns of a height that made visual inspection impossible, were reconstructed** through the Laser Scanner and the BIM model. Then there were investigations into the materials, which gave the NET Engineering designers detailed knowledge of the health of each structural element. Starting from the information gathered, the reinforcing armature was designed – designated with BIM software, **the steel jackets respond precisely to the features of deterioration of each pillar**, providing the client with a specific, effective and efficient answer.

Point clouds from Laserscan survey of the depot

3.

