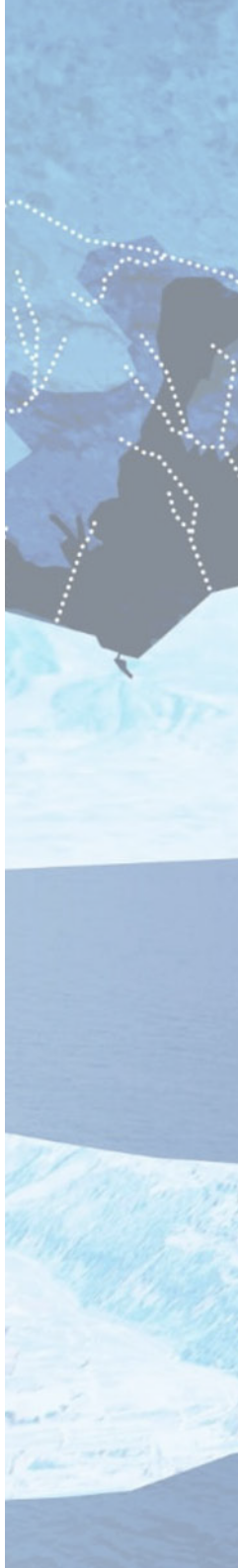
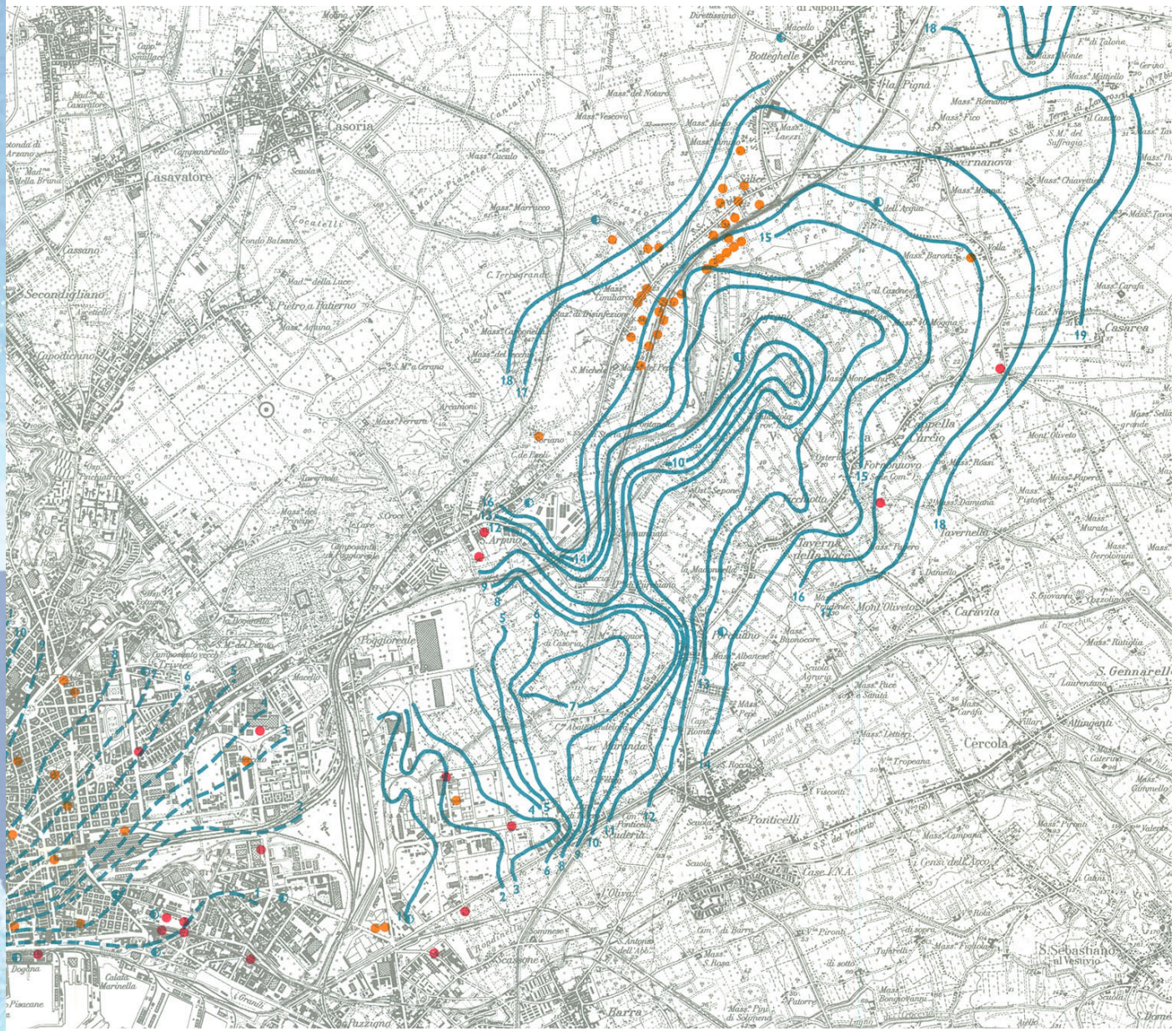

East-Side
Naples
Aquifer
La Casa dell'Acqua (2021)

East-Side Naples Aquifer

CoolCity_HHydrotopia
laboratorio architettura nomade
info@lanhub.org
napoli - dicembre - 2022



The area subject to attention is the vast territory of the riverbed of the Eastern Water-bearing stratum in Naples.



The research was conducted by studying the historical maps conserved in urban museums, working on numerous on-site inspections, monitoring and observing the areas characterised by the riverbeds and the channels, both covered and uncovered, from the green agricultural residue and from the characteristic plant life of these territories.

The documentation is the resulting product of the help of numerous interviews with the inhabitants, the workers and the people that use this territory, meeting and speaking with the administrations of the interested councils and establishing exchange and collaboration relationships with the bodies that manage the waters that are object of our attention.

Progression of the water-bearing stratum, Poligrafica & Cartevalori (1967) - IMG 2

The inhabitants of this area have a very close ancestral relationship with the waters that come from Vesuvius and Nola that arrive at Porta Capuana via gravity at the confines of the ancient city of Neapolis. On the ancient maps, the eastern area outside the city walls is described in minute detail, giving it an equal value to the urbanised city part.
The thousands of years of Naples's history was certainly possible thanks to the abundant waters that came its way and that could be used as the need arises for agriculture, to prevent sieges from enemy armies and to feed the textile, manufacturing, armament and pasta-making industries etc.

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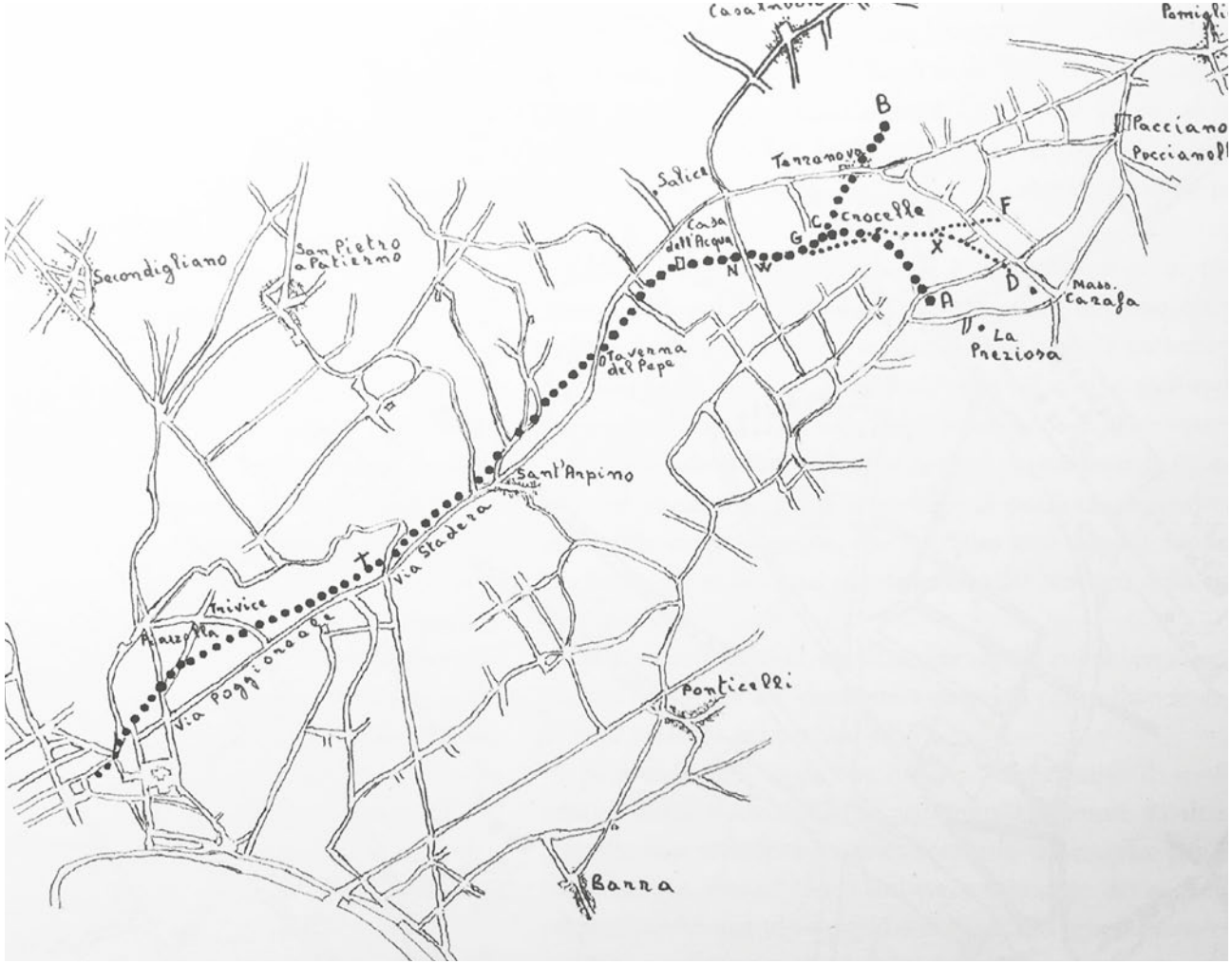
Map of the Naples area (1778) - IMG 3 - Foliage on the waters - IMG 4

From the earliest times, these waters have been used and transported to the city. Clemente Esposito, speleological engineer with a thorough knowledge of the Neapolitan substratum, dated the beginning of the building of the Bolla Aqueduct to the 3rd or 2nd century BC. It was an elaborate infrastructure, perfected and implemented in over two thousand years of urban history.

The first historical sources available date back to the 16th century when the surveyor Pietro Antonio Lettieri, commissioned by Don Pedro de Toledo to design a new aqueduct for the city of Naples, praised the talent of the builders who, via the drainage channels, managed to transport considerable amounts of water from the water-bearing stratum to the city gates.



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Reconstruction of the route of the Bolla Channel from the Naples Aqueduct - IMG 5 - During the focus group at the lan - IMG 6

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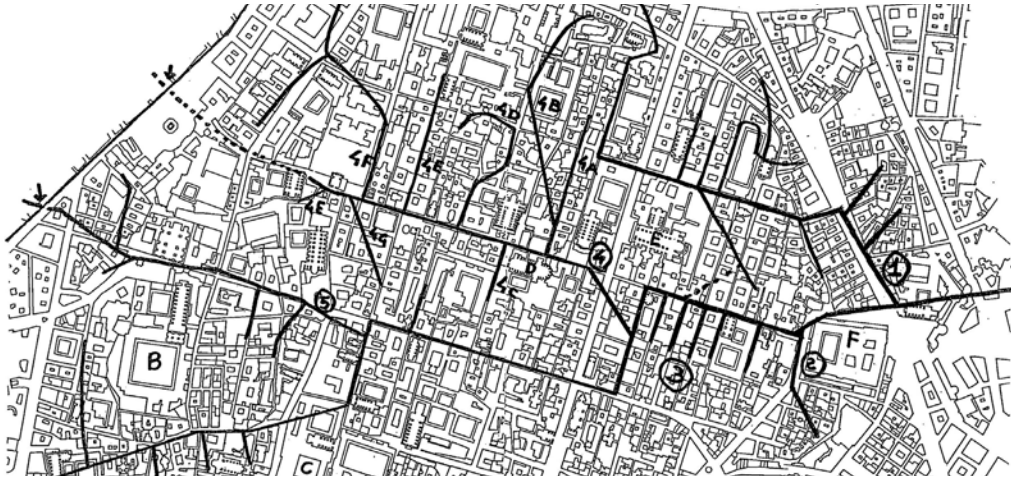

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In 1612, the engineer Ciminelli received the assignment to construct a new acqueduct and divide the waters of the Bolla into two separate branches, one for the city and its inhabitants and the other to feed the mills on the channels, from Porta Capuana to the Carmine gate. It is then that the excavations were checked to intercept “La Preziosa” and the “Taverna Nova”springs in the area of Mount Somma, channels that merged into the “Braccio di Benincasa” and, together with a fourth branch known as the “Grotticella”, flowed into the Water House, a building that still existed even though it is no longer available to Naples Council.

Once inside, the waters flowed into a tank and bubbled out, “volla” in the local dialect. Then, separated by a stone partition, the two channels branched off from the aqueduct, the underground channel went to Porta Capuana in the city centre and the above-ground channel fed the mills before heading into the sea near the Maddalena Bridge.

Detail showing the dotted line of the aqueducts from the Duke of Noja’s Map (1750) - IMG 7 -
Branching of the Bolla Aqueduct from the Subsoil of Naples by Clemente Esposito - IMG 8

The principal channel, according to Melisurgo's description, flows into the city at a quota of 12 metres above sea level and continues to Porta Capuana, via Tribunali, vico Zuroli, San Biagio dei Librai, vico Salvatore, vicoletto Mezzocannone, Bianchi Nuovi and ends up at the Medina fountain at a quota of about nine metres above sea level. Therefore, the first branch leaves from Porta Capuana and goes into the city and is down as the Carbonara Branch or the Roberto I Branch. The other branches serve other quarters of the city.

The Bolla Aqueduct was in use until 1885, up to when the convention between Naples Council and The Naples Water Works Company Ltd was signed where the explicit ban was mentioned of not using other waters if not those of the Serino Aqueduct. An external tract that had been cleaned up, renovated and plastered continued to fulfil public needs as far as Piazza Municipio and was further lengthened to reach Villa Comunale and Piazza Sannazzaro.

In 1944/45, to compensate for the lack of water on the hills caused by the damages to the Serino aqueduct, the Anglo-American Corps of Engineers took on the construction of numerous wells in the Lufrano area, substituting the traditional catchment techniques with drainage. The waters were transported to the city via the ancient Bolla channel. They went into a tank under the Capodichino hill and from there were fed by a pump that used to fuelled by diesel and then electricity, into two tanks positioned halfway along the promontory before being further pumped towards the dry quarters of the city.

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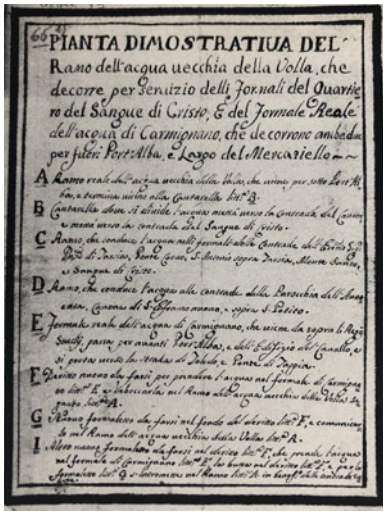

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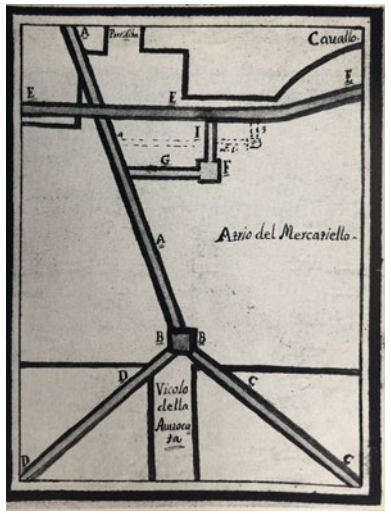

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The street signs near Porta Capuana remind us of a cancelled history - IMG 9 - Plan showing the Bolla branches inside the city walls, from "L'Acquedotto del Carmignano e lo sviluppo della Napoli Barocca" - IMG 10-11

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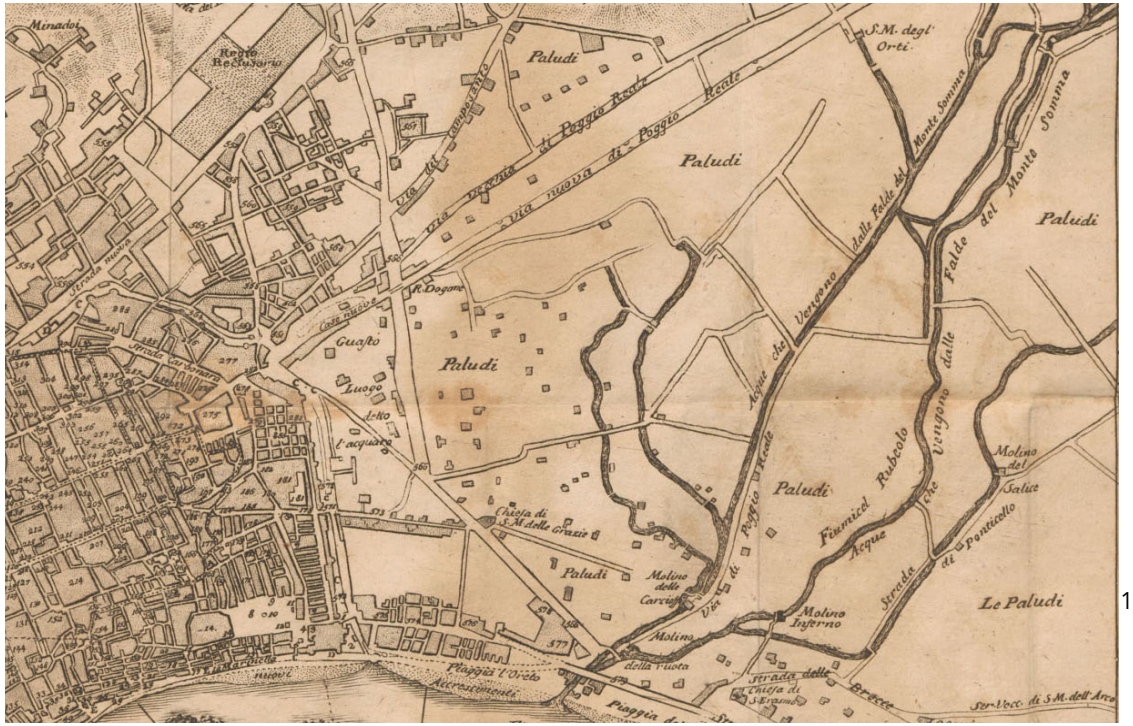

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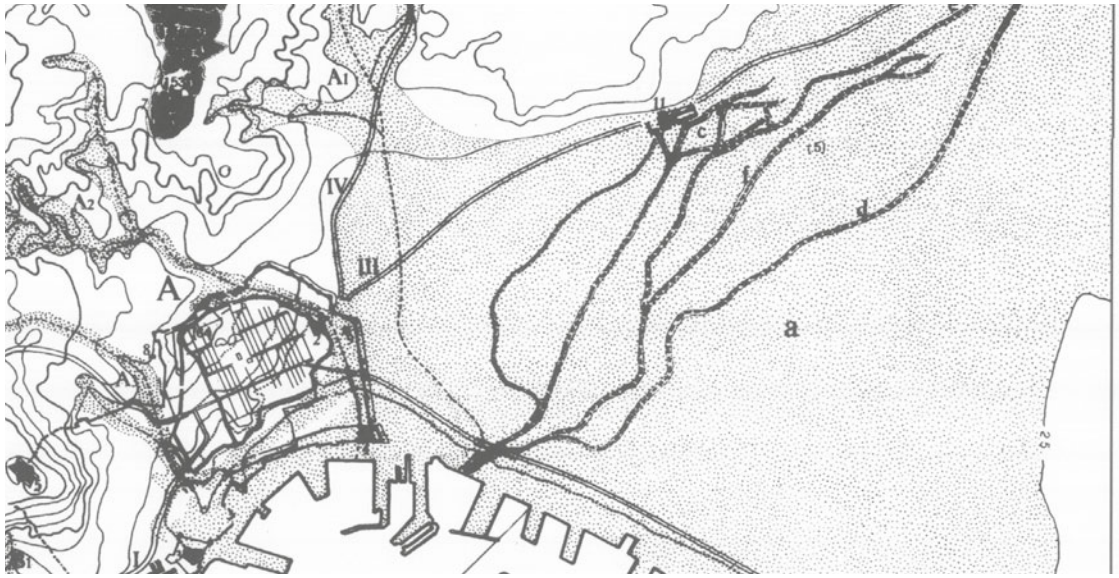

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Useful Knowledge (1835) - IMG 12 - Carletti (1900) - IMG 13-14 - Aldo Loris Rossi (1986-99) - IMG 15

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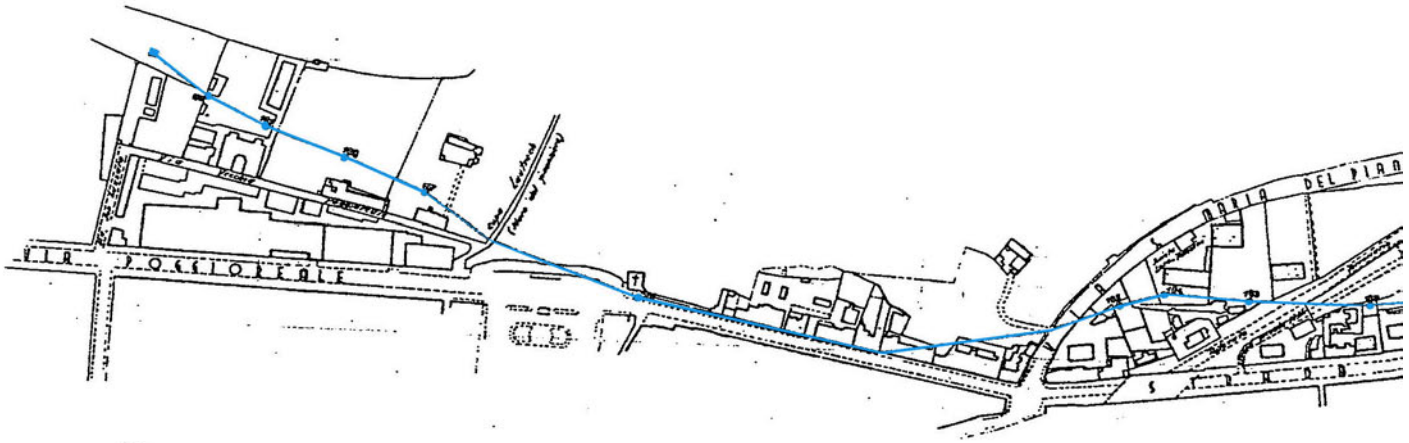
Coming home from the fields, F. Palizzi (1800) - IMG 16 - Ponticello and Botteghelle plastic greenhouses - IMG 17 - The Maddalena Bridge in a painting from the 18th century - IMG 18 - Water in one of the channels that reached



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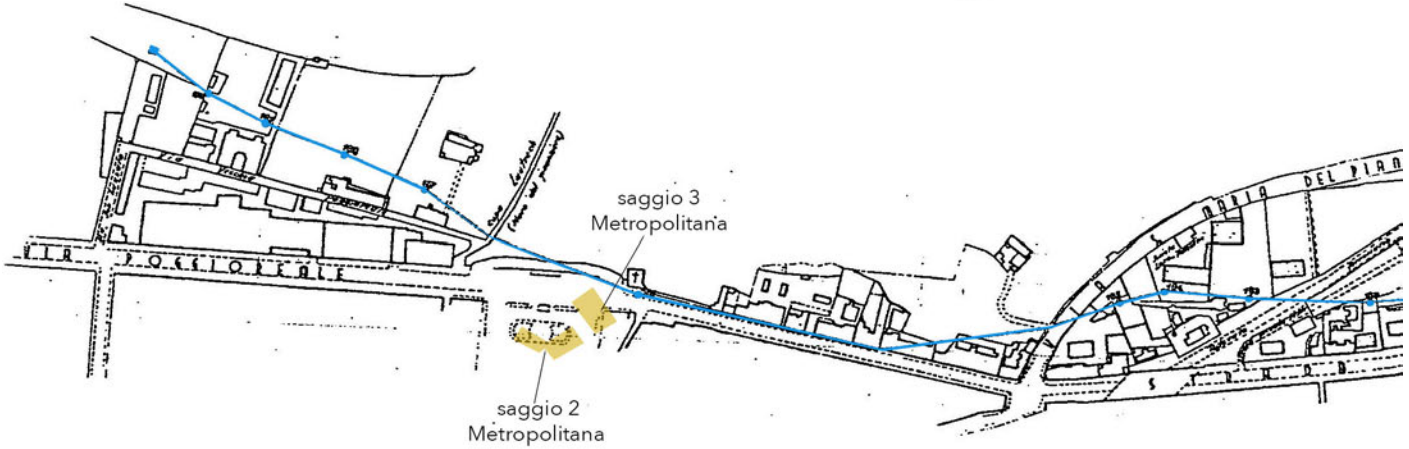

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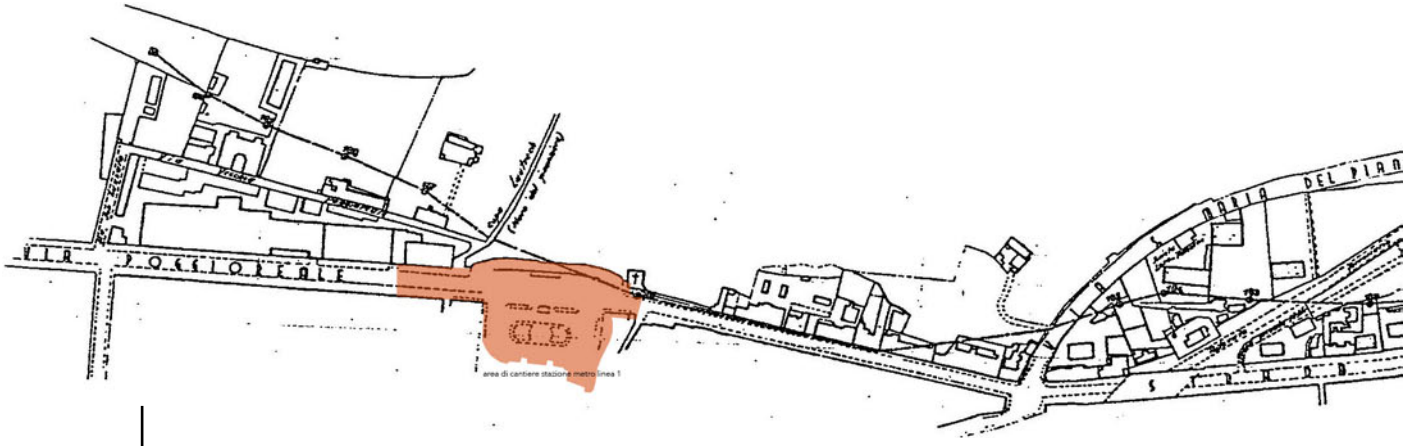

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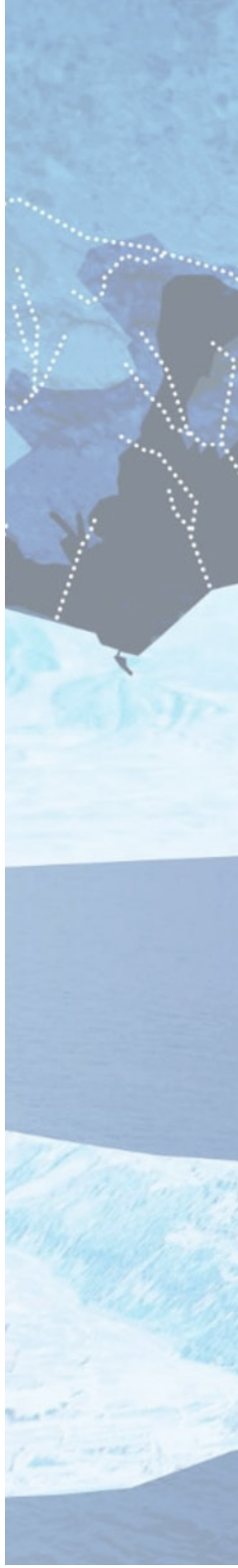
The dotted line of the Bolla Aqueduct channel - IMG 20 - Precautionary trials at the start of construction - IMG 21 - Clutter at the Stazione Metro 1 Building site - IMG 22

During the research into the individualisation of this tract of the ancient aqueduct and along with collaboration from ABC, on the 23/07/2021, we tried an initial access to the small wells located in their Casalnuovo depot but the channel was full to overflowing and couldn't be inspected.

On the 04/08/2021, along with the Centro Speleologico Meridionale (CSM), the technicians from Leica-Leidar-Geosystem, Bianca Capece's consultancy and under the supervision of Professor Nick De Pace from the Rhode Island School of Design, we managed to pinpoint another entrance via a tunnel accessible from via San Lorenzo, the historical seat of the aqueduct electricians.



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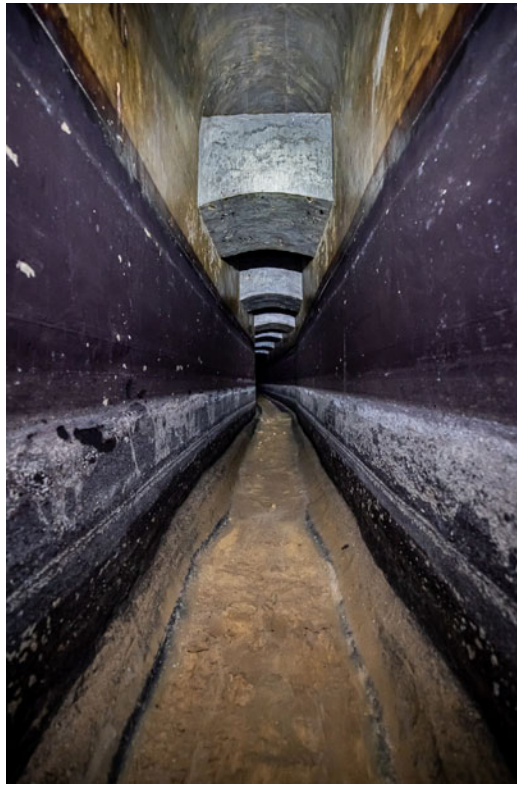

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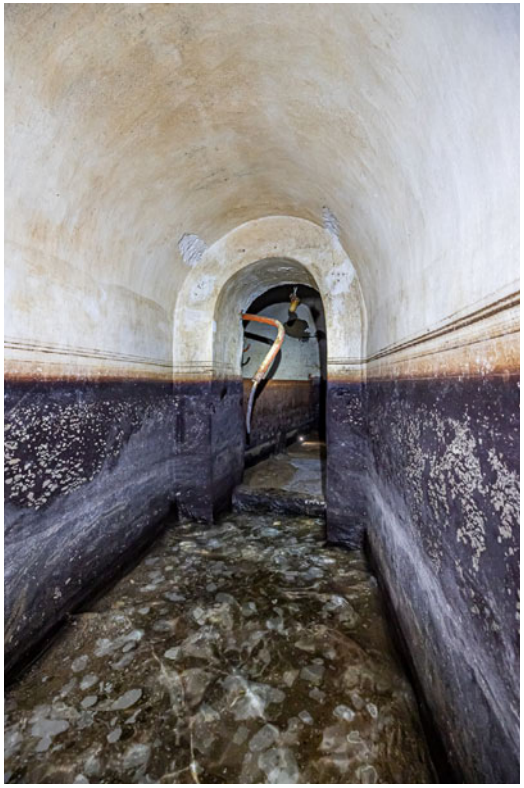

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Bolla Aqueduct Cistern - IMG 23 - Bolla Aqueduct Channel - IMG 24-25-26-27

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Via a small well, the water reaches a tank from which two branches exit, one heads south and after several metres, reaches another tank where pumps are positioned to pump the the water to a higher quota (work by military engineers)

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The red line shows the course of the Bolla Channel - IMG 28 - A glimpse of the Metro 1 Station Poggioreale building

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The other branch winds eastward and is walkable for several hundred metres up to a blockage caused by a landslide. The infrastructure is transversally cut off, several yellow shuttering panels at the edges of the channel arch highlight the attempt to stem further subsidence.

On the 03/02/2022, with the support of the CSM on an expeditious survey armed with a compass and distance-measuring laser, we managed to ascertain the exact point where the landslide happened. Putting the discovered collapse onto an aerial photograph and taking into account a minimal margin of error due to the size of the photo, the area of the traced channel results as being the intersection of the channel with the Line 1 of the Metro building site at exactly 363 metres from the point where the water leaves the access tank.

The site inspections were undertaken with the technical support of Mauro Palumbo and the engineers Mario Cristiano and Antonella Feola.

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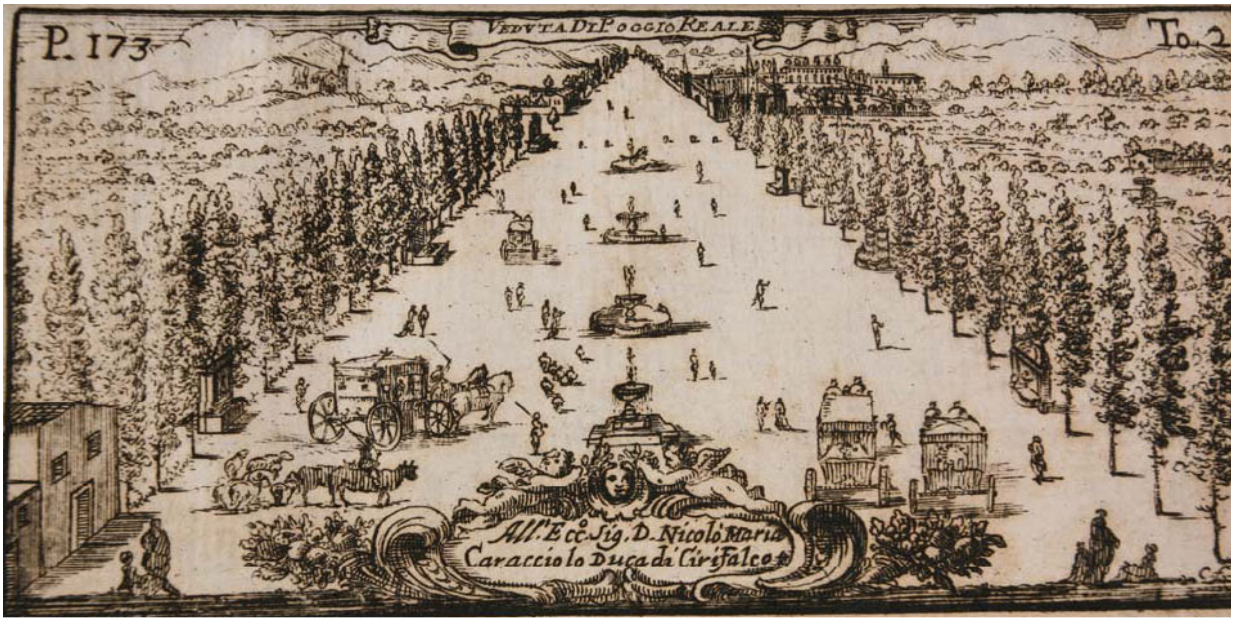
Interruption of the channel - IMG. 30 - During the survey activities - IMG 31- Channel - IMG 32



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It isn't easy to determine who is responsible for the management of these infrastructures, that have lain abandoned for years.

In the documentation lent to us by the Ufficio del Sottosuolo del Comune di Napoli, the section outside the Bolla Channel walls isn't even brought up to a quota of about five metres below street level, despite its noteworthy size and the extent of the building work from Casalnuovo to Porta Capuana.

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Domenico Antonio Parrino (1718) - IMG 33 - Rasulo (XVII secolo) - IMG 34

The Naples Metro, questioned about the damage at the Poggioreale building site did not show any interest in understanding the cause or any future participation.

We trust that a collaborative spirit will prevail among the various actors involved and the identification of shared proposals will restore complete integrity to the ancient infra- structure, also with a view to possible future uses.

Effective action is desirable to remove the waters that now fill the unused ancient channel in the section upstream of the Metro 1 station construction site as far as Casalnuovo, where we attempted the first access.

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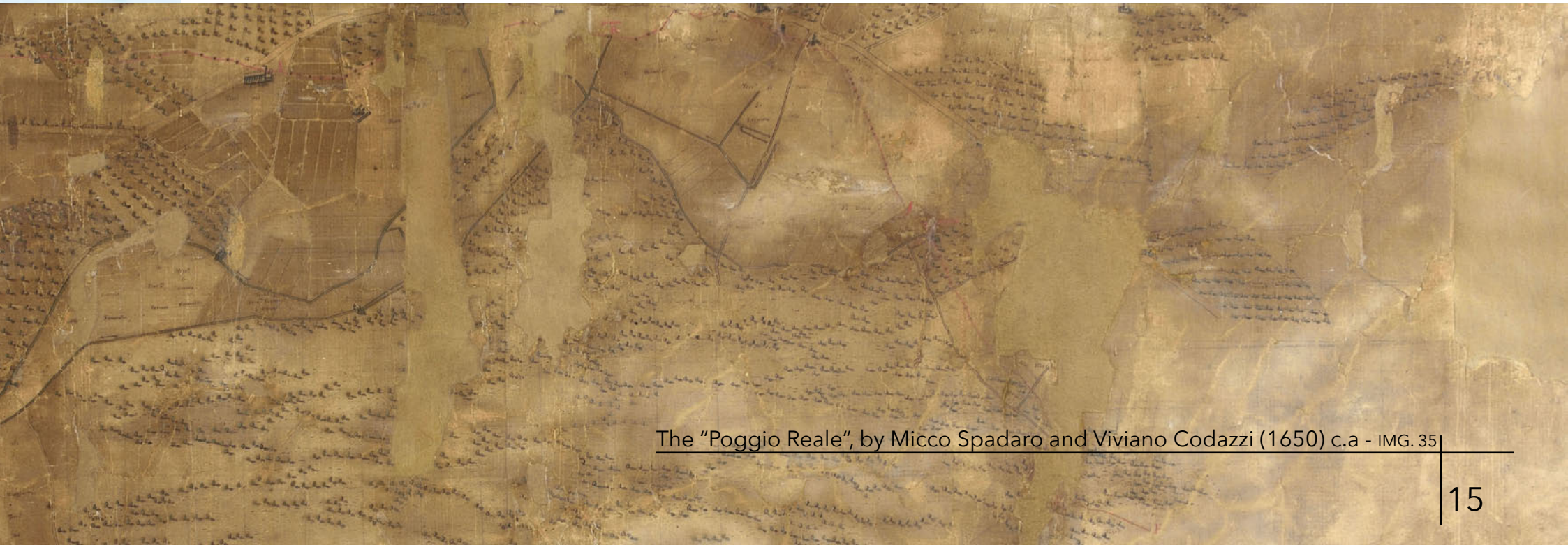

The “Poggio Reale”, by Micco Spadaro and Viviano Codazzi (1650) c.a - IMG. 35

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The discovery of the main channel from the Bolla Aqueduct has given new impetus to the CoolCity research. To consolidate the proposal for the re-functioning of abandoned infrastructures for the purpose of its use in line with the proposals for urban and civic cooling, also bring attention to the elements to be recovered to implement the necessary structural works is, at this juncture, among the main objectives of the CoolCity project.

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View from Monte Somma - IMG 36 - Riverbed descending from Vesuvius - IMG 37 - Ruins from the Bourbon era - IMG 38

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The Casa dell'Acqua (Water House) - IMG 39 -
Pischera close to Gianturco - IMG 40 - Volla Mill ruins - IMG 41 -
Pischera and the Volla irrigation channels - IMG 42 -
One of the visited archaeological sites in Casalnuovo - IMG 43

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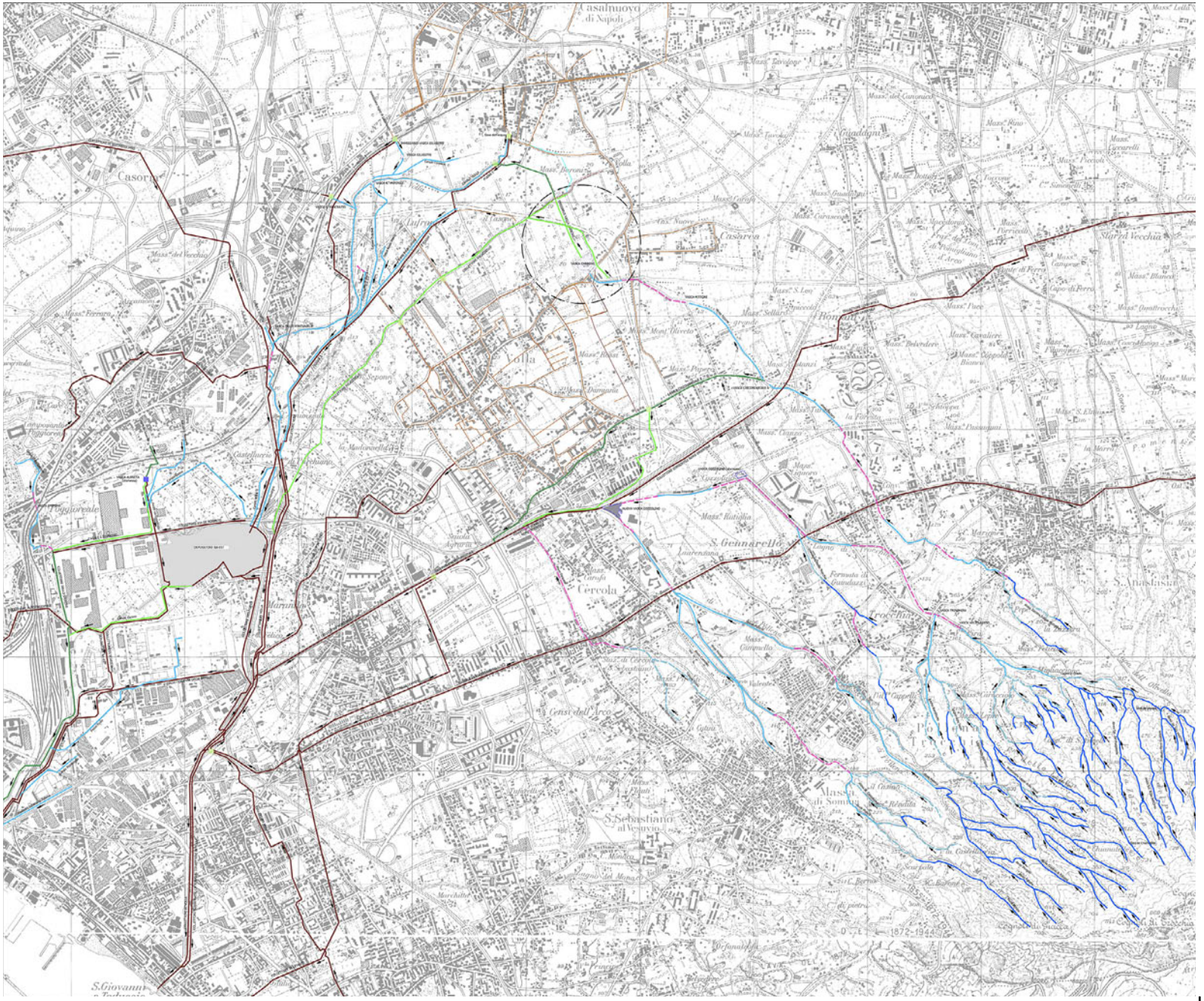
The Maddalena - Riverbed covered by buildings - IMG 44-45 -
Ruins of a mill near the Maddalena Bridge - IMG 46
Maddalena Bridge - IMG 47



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Course of the waters from Vesuvius to the sea, Volla Drainage Consortium - IMG 48

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Channels near Volla and Casalnuovo - IMG 49-50-51-52-53

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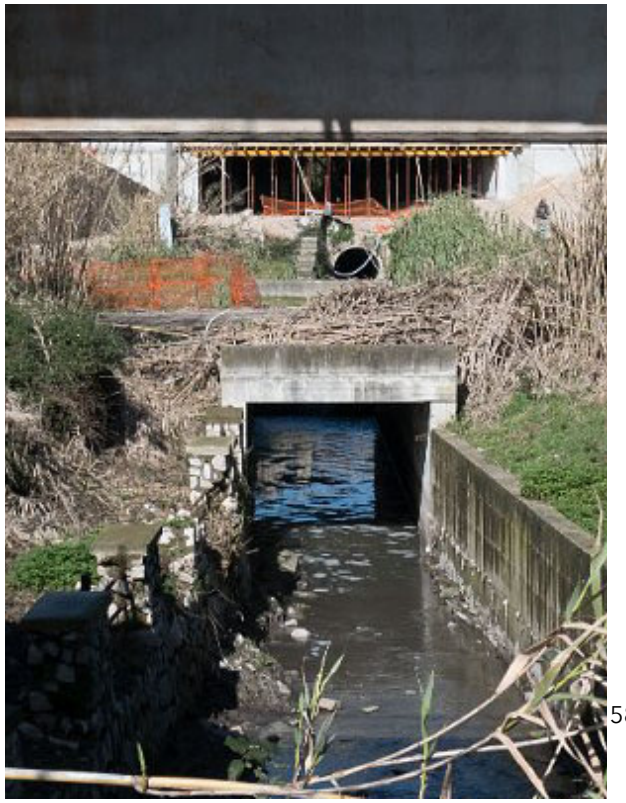
Channels near Volla - IMG 54-55
Channels near Botteghelle - IMG 56-57



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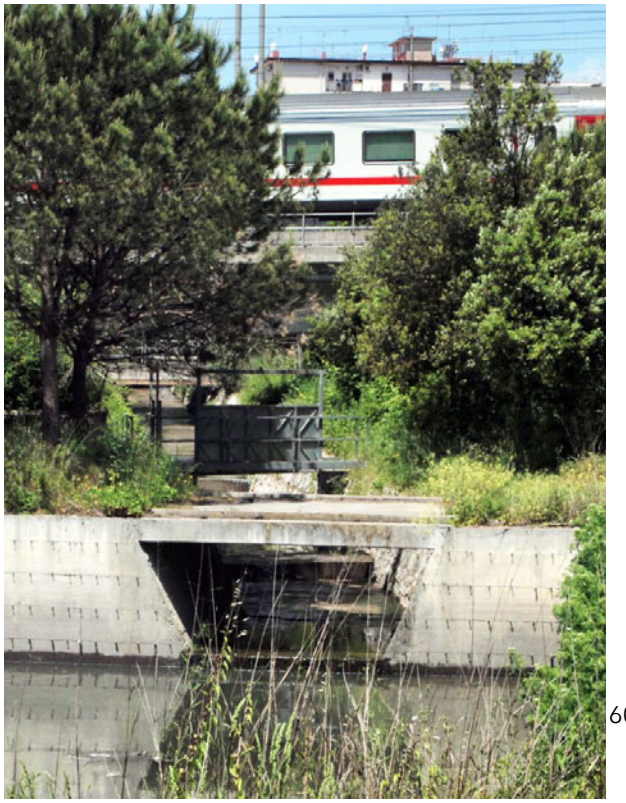

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Channels and building sites, Casalnuovo - IMG 58 - Entrance to the channel in a closed pipe near Gianturco - IMG 59 - Channel and railway - IMG 60 - Railway infrastructure near Salice - IMG 61 - Sewage channel with weir on the Bolla Channel - IMG 62

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Tracing the length and breadth of the eastern aquifer territory, weak urban and land use planning can be perceived. The ancient roadways are broken up by numerous engineering works: the Circumvesuviana routes - along the Naples-Acerra-Baiano line, numerous stations are dilapidated in poorly urbanised territories, the Naples-Salerno railway line, the Trenitalia high-speed line, the Caserta-Naples-Salerno A1 motorway and the Trenitalia High-Speed line to Bari are just a few examples. We have no information about pre-existences obliterated or hidden by these infrastructures built in the recent past, we do know however, that in the first ten kilometres of the Naples-Bari High-Speed railway section under construction, a dozen archaeological excavations have been made, at various heights and thus coming from different historical periods. The presence of wells, channels, mills and other traces of human water-related activities testify to the close relationship of the inhabitants with the local waters. Rendering these studies common knowledge would bring a deeper understanding of the area and help give new perspectives and new ideas for urban design that is better-integrated with the nature of the places.

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Naturally closed-in riverbed - IMG 63 - Building site in the agricultural area near Volla - IMG 64 - Acquedotto Acqua Campania building site near Volla - IMG 65 - Entrance to the agricultural area near SaliceSalice - IMG 66


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Railway viaducts near Volla - IMG 68-69-70-71-72-73-74-75 - Rising of the water-bearing stratum near the railways infrastructures - IMG 76-77-78-79

The abundant waters present in the east still mark the landscape in an incisive way, not only when they flow on the surface, despite the numerous attempts perpetrated in the last century to erase their traces, but in recent years with the rise in the water-bearing stratum, imposing themselves on the constructions built in the last 30 years. During the monitoring period, numerous problems caused by the rise of the eastern water-bearing stratum, flooding, subsidence, and collapse were found, requiring various types of interventions. Probably the congestion of these works carried out since World War II now weighs significantly on urban planning. We have no systematic and detailed information on active drainage activities in the vast territory of the eastern water-bearing stratum. The various infrastructure management agencies (Metro/EAV/Municipality etc) do not share information on the problems arising from flooding and landslides. As far as we have been able to ascertain during the monitoring period, we have knowledge of active water pumps in the level of the garages of the Centro Direzionale; for the operation of the circumvesuviana lines; to clear numerous basements in the apartment buildings built in the last 40 years near the Water House; and to restore the sub-soil in various buildings present on the entire eastern water-bearing stratum. There are many court orders against the Metro Line 1, believed to be the cause of frequent flooding. But the construction sites opened by the new subway are only the latest in a series of interventions that have taken place since the postwar period, and recent disruptions the likely reflection of rising groundwater levels.

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Plan of the Volla Drainages (1889) - IMG 80
Sections of the Casalnuovo-Volla countryside from Google - IMG 81
Volla-Poggioreale - IMG 82 - Poggioreale-Gianturco - IMG 83
Gianturco-Centro Direzionale - IMG 84 - Gianturco-Marinella - IMG 85

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The eastern water-bearing stratum has been used intensively for decades via the countless wells in the industrial establishments situated throughout the territory and, above all, by the important, imposing Lufrano well fields for potable water purposes. A consequence of these intense uses has been a notable lowering of of the level of the water-bearing stratum, which has fallen to well below the foundations of the buildings constructed throughout the second half of the last century. The re-ascent of the eastern water-bearing stratum piezometre, accelerated by the progressive suspension of civil, agricultural and industrial drawing of water, causes buildings, which were built on dry soils at the time, to increasingly come to terms with the presence of water in the foundations, as can also be seen in the area of the Centro Direzionale and along the metropolitan line itself under construction.

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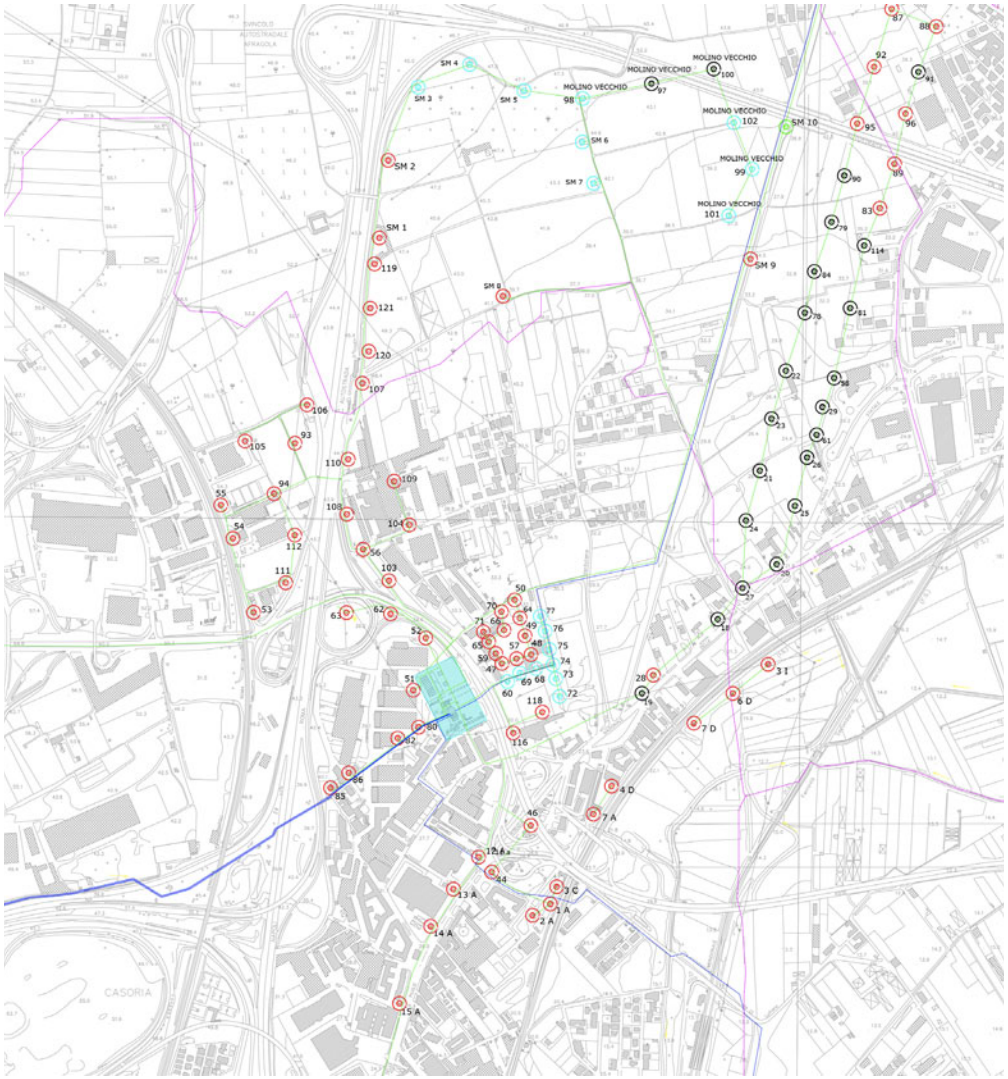
Canale Reale (XIX century) - IMG 86 - La Marinella (XIX century) - IMG 87 - Via Arenaccia (XX century) - IMG 88



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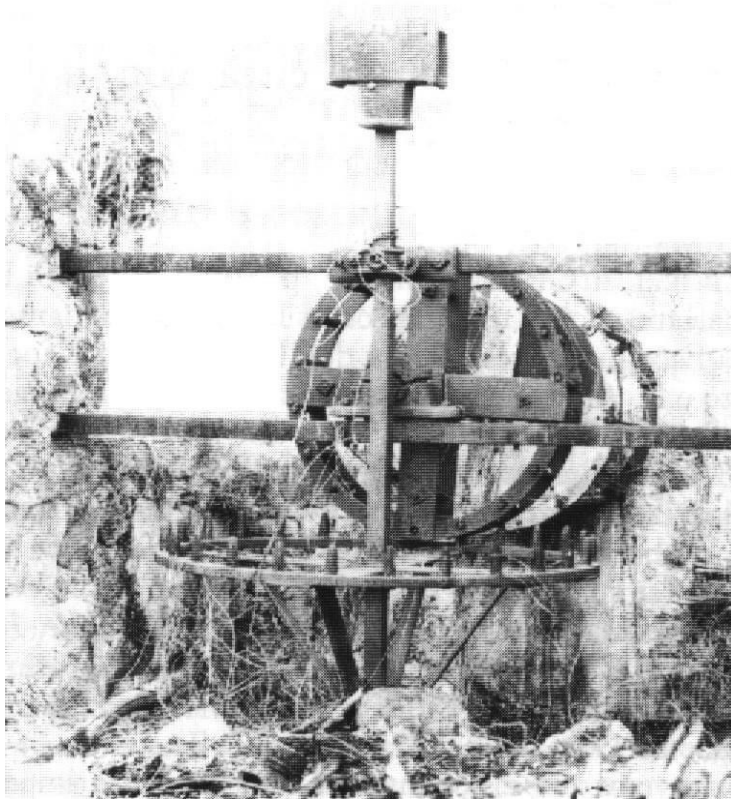

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Area of the A.B.C. wells in Lufrano - IMG 89 - Noria used for raising the water from the irrigation tank - IMG 90

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Epilobium hirsutum L (Water Carnatio) - IMG 91- Lemna sp. pl. - IMG 92 - Equiseto IMG 93 - Garlic - IMG 94

Detail from Topography of the Neapolitan countryside, Rizzi Zannoni (1736-1814) - IMG 95

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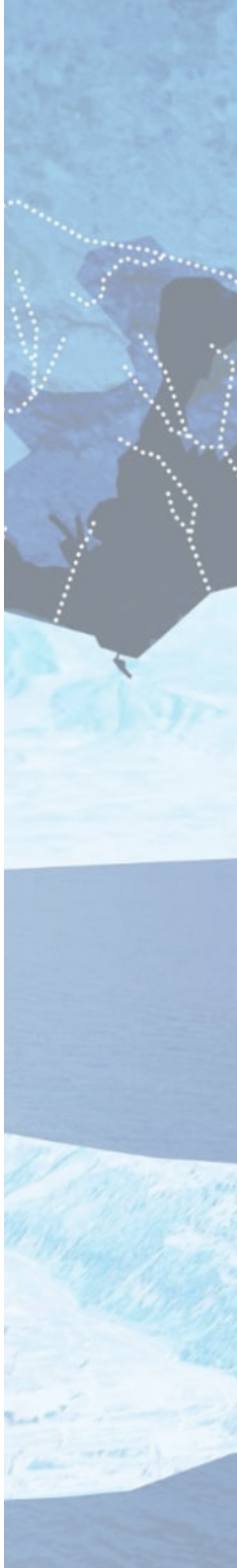

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C.S.M.
Centro Speleologico Meridionale
Via Atri n.23, 80138 (NA)

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