Reperire Via Aqua
The Analysis of Three Roman Cities

Cesia Lopez

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Piranesi mapped ruins. Lanciani mapped layers. Nolli mapped public space.

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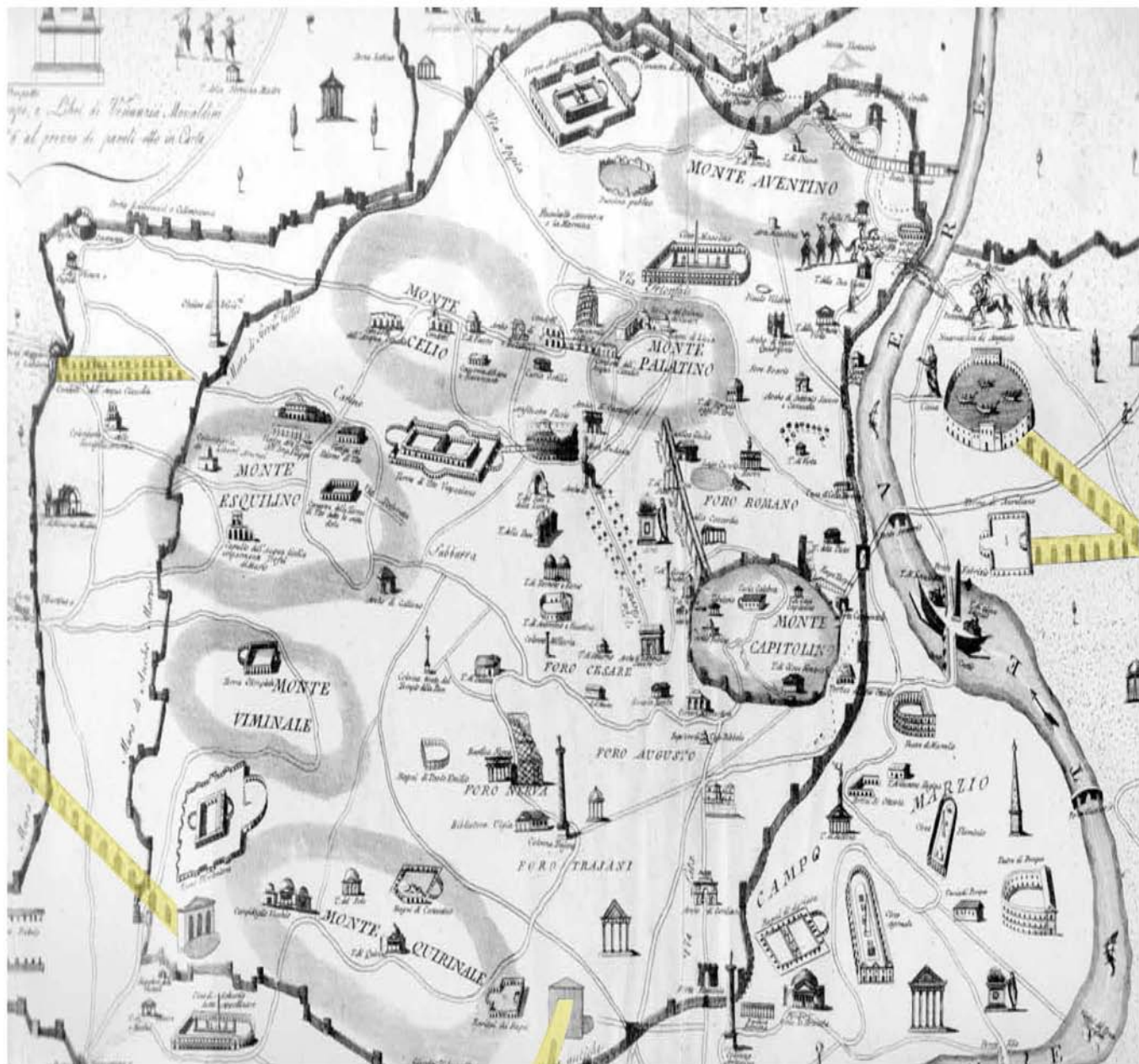
1805- Roma antica di Andrea Manazzale

MAPPING the seen, the heard, the obvious, the hidden, the textures, the smells, the buried, the WATER

Describing the major characteristics of what makes Rome what it is today has been the constant study and obsession of scholars,architects, and seasoned travelers. Navigating through the serpentine roads and finding one's way from the local coffee house near the Pantheon to the monument of Vittorio Emanuele II is a challenge that eludes few. Relief: the common representation of the city that allows for both a visual and analytical comprehension of Rome's complex urban fabric is a map.

Recording architecture, roads, and aqueducts requires more than a trained eye and a Google map. Understanding what lies on and below the surface demands a complete submergence into Rome's context and form. Submergence, or the act of placing under water, is a symbolic approach to finding one's way via the waters of Rome. As markers that begin to re-emerge through a new reading of Rome, every fountain possesses a certain symbolism, every aqueduct an historical importance, and every grotto its unique characteristics.

By documenting and representing infrastructure that provides opportunities for public space through the medium of water, one can begin to determine design solutions within Los Angeles, a semi-arid desert faced with real water scarcity problems. This investigation focuses on representing three major Roman cities and their respective aqueducts in Los Angles, Rome, and Istanbul. Through this exploration, I will look at water in the realm of architectural aesthetics, spectacle, and private/public urban domains by mining design opportunities from research questions addressed within these historical contexts. By following a similar approach of field visits to each of these three cities, I have collected artifacts and documented the major aqueducts and other water systems that have significantly impacted urban form. Rome and Istanbul perform as mediators for learning how to design with water through a focused study of ancient systems and indigenous collaborations with public space at both an urban and architectural scale. The data these historical cities provide creates an assortment of tools that may be applied to the design of Los Angeles, a modern city founded on ancient Roman principles. The many layers and historical context describing each city's water system is uncovered, represented, and identified as sites that demonstrate a formal language similar to Los Angeles's water systems with a particular focus on its historic infrastructure
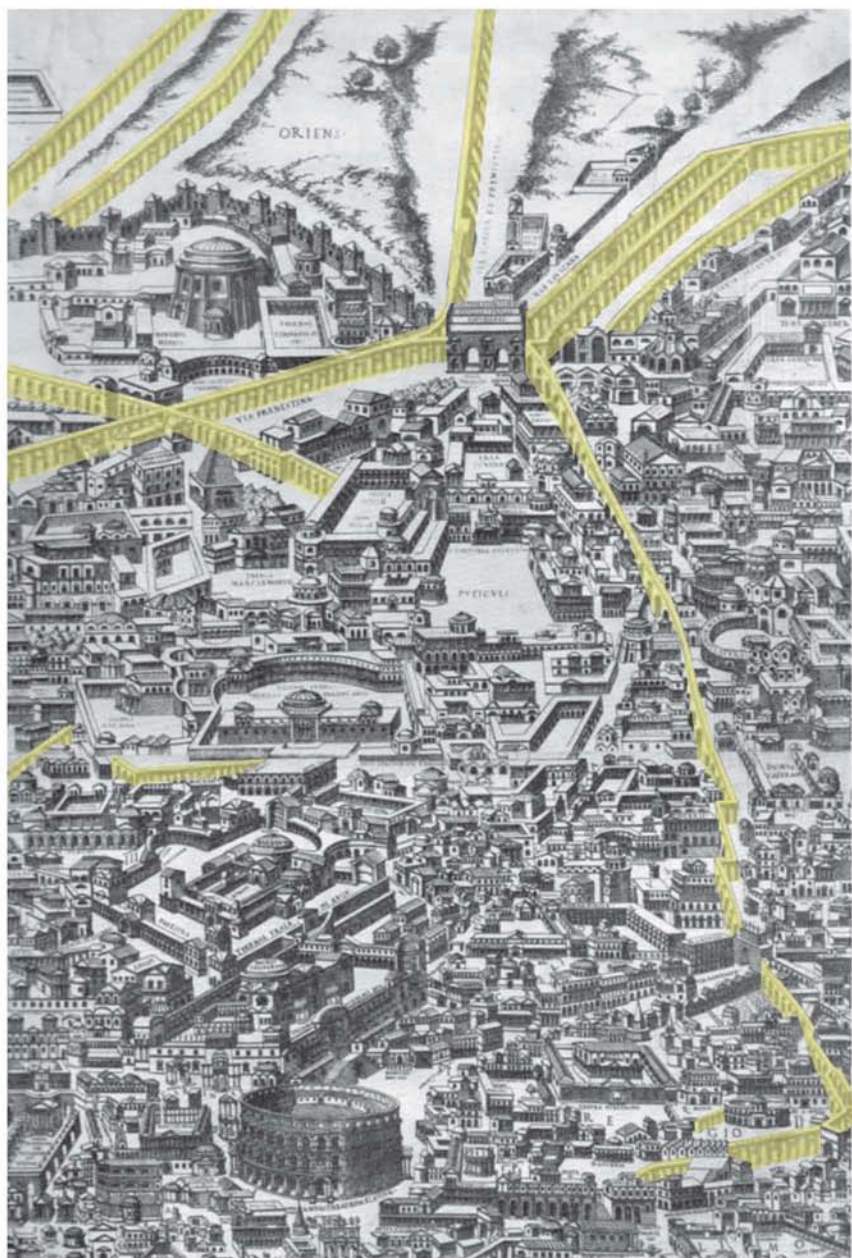
1561- Roma antica di Pirro Ligorio: zona della Porte Tiburtina e La Bicana e del Colosseo

Infrastructure and Public Space:

The development of infrastructure has had a significant effect on the design and planning of cities throughout the world. Webster defines infrastructure as "the underlying foundation or basic framework, of a system or organization" and "the system of public works of a country, state, or region required for an activity." Through the interpretation of an existing landscape as a living organism, Alex Wall emphasizes the role of infrastructure as a possible moderator for design by listing a series of "urbanlandscape" precedents. His definition of urbanlandscape proposes a new methodology for designers, insofar as the term acts a dynamic lens for implementing design in a constantly changing metropolis.

Quoting architect Victor Gruen, whose view of design incorporates urbanism with architecture, Wall analyses context, form, and program as a more coherent form of design, writing:

> In recent years, a number of urban projects in Europe have fallen between the traditional categories of landscape and urbanism. These works signal a shift of emphasis from the design of enclosed objects to the design and manipulation of larger urban surfaces....This is landscape as active surface, structuring the conditions for new relationships and interactions among the things it supports. (Wall 1999, p. 233)

Wall illustrates different urban typologies affecting a typical metropolis that may be condensed to the square, the park, and the district, comparing them to the contemporary city which includes infrastructure, networks flows, ambiguous spaces, and polymorphous conditions. His analysis results in a design philosophy that privileges temporary, adaptive, and disposable responses to urban questions. As Victor Gruen stated in the 1955 Aspen Design Conference:

Architecture today can't concern itself with that one structure that happens to stand upright and be hollowed 'building' in the conventional sense. It must concern itself with all manmade elements that form our environment; with roads and highways, with signs and posters, with outdoor spaces as created by structures, and with cityscape and landscape. (Wall 1999, p. 235)

Projects such as Archigram's Instant City illustrate large-scale infrastructure that acts as an initiator for public events while simultaneously representing new types of architecture that float above temporal, arbitrary, and siteless conditions.

Wall's approach to design proposes the "grafting of new instruments and equipment onto strategically staged surfaces allows for a transformation of the ground-plane into a living, connective tissue between increasingly disparate fragments and unforeseen programs."(Wall 1999, p. 235)
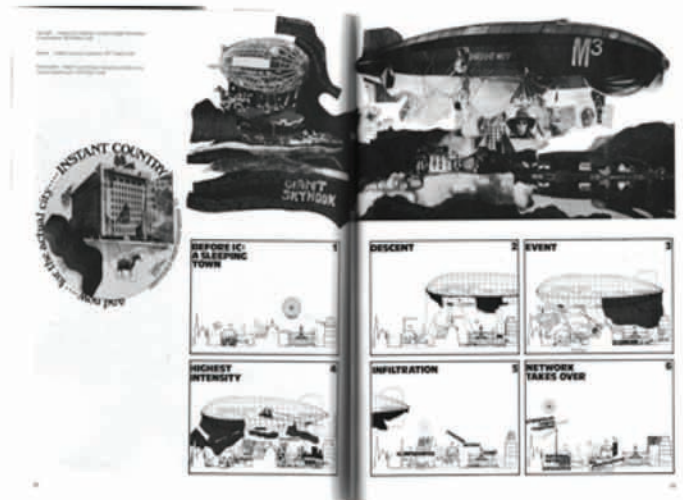
Archigram: Instant City
(http://brianholmes.files.wordpress.com/2008/10/archigram_instantcity.jpg)
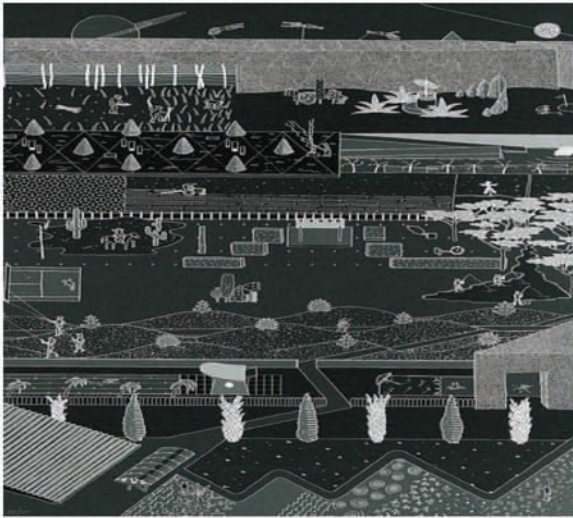
The departure of the "hollowed building" signals a shift from the predictable to the provisional city. The focus is no longer the defining of an autonomous, inanimate object but the interpretation of systems that feed off a complex and constantly evolving organism that is both unforeseen and uncontrollable. The design for such conditions is not a new occurrence with OMA's strategy for Parc de la Villette having put forth a proposal for incorporating a void in the middle of Paris France with a network of functioning systems that would initiate activities in an urban scale. By ignoring the program, and instead creating main arteries that would feed a continuously unpredictable demand and communal interest over a period of time, OMA's design resulted less from stylistic considerations and more from function and adaptation. As Charles Waldheim states, "Tschumi's and Koolhaas's projects for Parc de la Villette signaled the role that landscape would come to play as a medium through which to articulate a postmodern urbanism: layered, non-hierarchical, flexible, and strategic. Both schemes offered a nascent form of landscape urbanism, constructing a horizontal field of infrastructure that might accommodate all sorts of urban activities, planned and unplanned, imagined and unimagined, over time."(Waldheim 2006 ,p 41)

Koolhaas's proposal for a new city in Melun-Senart France also illustrates the potential for infrastructure to perform as a supporting vessel that facilitates the implementation of activities yet to be determined. The demarcation of a supporting system, emphasized in the voids delineated through a larger master plan, focuses on the importance of networks that support program rather than a holistically defined building with little to no contextual relevance that is susceptible to stylistic and political change. It is through the delineation of systems that are spread across a larger urban context that architectural opportunities begin to arise. (Wall 1999, p. 238)

Deploying this strategy implies designing with an infrastructural agenda and moving away from modernism, and post-modernism, and explores visual representation that allows for architects to design with a larger set of tools enabling a more significant impact that anticipates results rather than creates them. It is in the reclamation of all surfaces within the metropolis, the voids and flows, the banal and novel, the active and inactive that extricates the design for the everyday use. As Stan Allen pointed out in his essay Points + Lines: Diagrams and Projects for the City "Architecture is understood as a discursive system that expresses, critiques, or makes apparent the hard realities of a world that is held safely at arm's length." (Allen 1999, p.50) The architect's own separation of conditions that are imperative to civic function, according to Allen, might be what has excluded the profession from meaningful urban development. (Allen 1999, p.51)

OMA: Ville Nouvelle Melun-Senart France http://www.oma.eu/index.php?option=com_projects&view=portal&id=716&Itemid=10
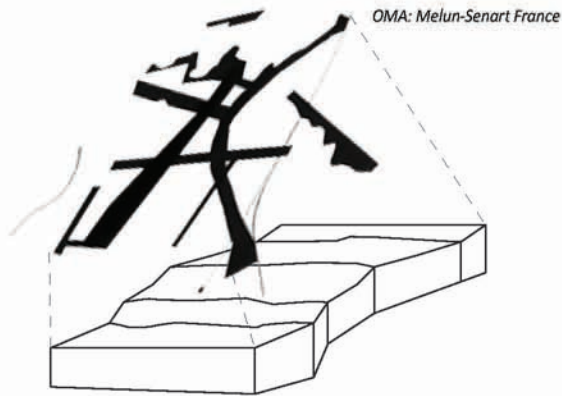
having a direct effect on the site by constructing it, being anticipatory by working with time, and by having static qualities while functioning as a cohesive system built of multiple parts.

OMA: Parc de la Villette (http://static.nai.nl/oma/Start_EN/Start _search.php?projectid=75&subcat_van=0&subcatid=0)

Allen introduces the term "infrastructural urbanism" as he presents his argument of the broader role of architectural design in a civic framework:
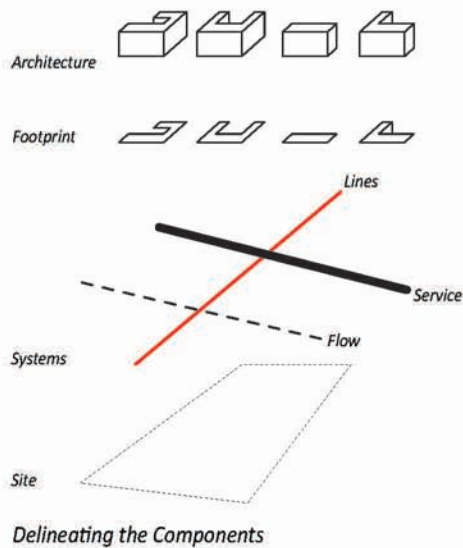
> Going beyond stylistic or formal issues, infrastructural urbanism offers a new model for practice and a renewed sense of architecture's potential to structure the future of the city. Infrastructural urbanism understands architecture as material practice- as an activity that works in and among the world of things, and not exclusively with meaning and image… Infrastructural urbanism marks a return to instrumentality and a move away from the representational imperative in architecture. (Allen 1999, p.52)

Infrastructural urbanism is further defined as a network of elements that can be broken down into a series of ideal conditions facilitating function and reorganizing the existing conditions of a city. In Allen's seven propositions, infrastructure is described as
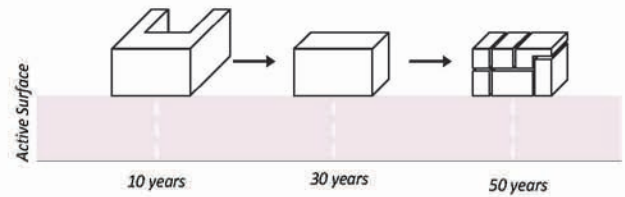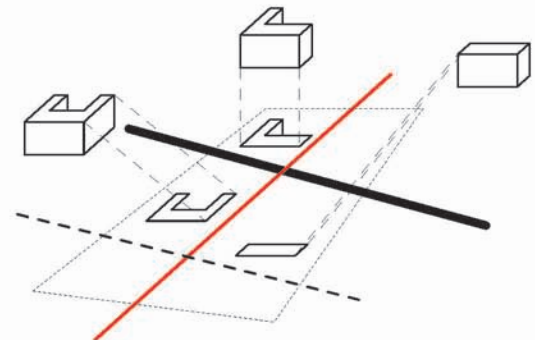
Infrastructural Urbanism: Elements and Conditions

OMA: Melun-Senart France

Infrastructure Constructs the Site

Active Surface

10 years   30 years   50 years

Adaptability and Change Over Time

Architecture

Footprint

Lines

Service

Flow

Systems

Site

Delineating the Components

A System of Parts Creating a Whole

Interpretational Diagram of Stan Allen's Seven Propositions for Infrastructural Urbanism (Points+ Lines: Diagrams and projects for the City)

Slippery Surfaces

The use of water as a design material has been represented in this publication through a series of scales, building types, and techniques. Designing for water evokes emotional and intellectual responses that have become emblematic of authority and power. As history triumphs over the representation of water — from lush gardens to ancient baths to historic aqueducts—and systems become layered with the overgrowth of time, water's political valence evolves. In other words, water's role has had a significant mark in the development of architecture and urban design from ancient cities to thriving modern metropolises. In urban design, the development and implementation of an efficient waterworks system becomes an important role in the survival of the city. From its foundation to the location of its major buildings, a city's relationship to its water sources becomes a major contributor to its success or failure. For instance, access to available drinking water as well as a proper drainage system has been one of the dominant factors that has shaped cities such as Los Angeles, Rome, and Istanbul.

In Rome, for instance, flooding due to heavy rain fall has been a major threat to the welfare of the eternal city resulting in a series of flood control projects that have been proposed to divert the Tiber River from Rome's historical center that date back as far as Julius Caesar in the effort to avoid catastrophe. General Giuseppe Garibaldi, "father" of united Italy, under the advice of Paolo Molini and Alessandro Castellani, a scholar and archeologist, favored the deviation of the river to the southeast part of Rome, where Cinecittà studios are currently located. Even though his proposal failed to passed legislation, efforts such as these characterize historic approaches aimed to controlling an otherwise unpredictable force. (Heiken, Funiciello, and Donatella 2007, p. 77) During ancient Roman times, the building of the Cloaca Maxima, an underground drainage channel built in 625 BC under the rule of King Tarquinius Priscus, aided in draining the area that would become Roman Forum by linking and existing brook to the Tiber. This channelization and diversion of the brook allowed for the urbanization of the Forum Romanum and eventual Roma Caput Mundi. (Rinne 2005)
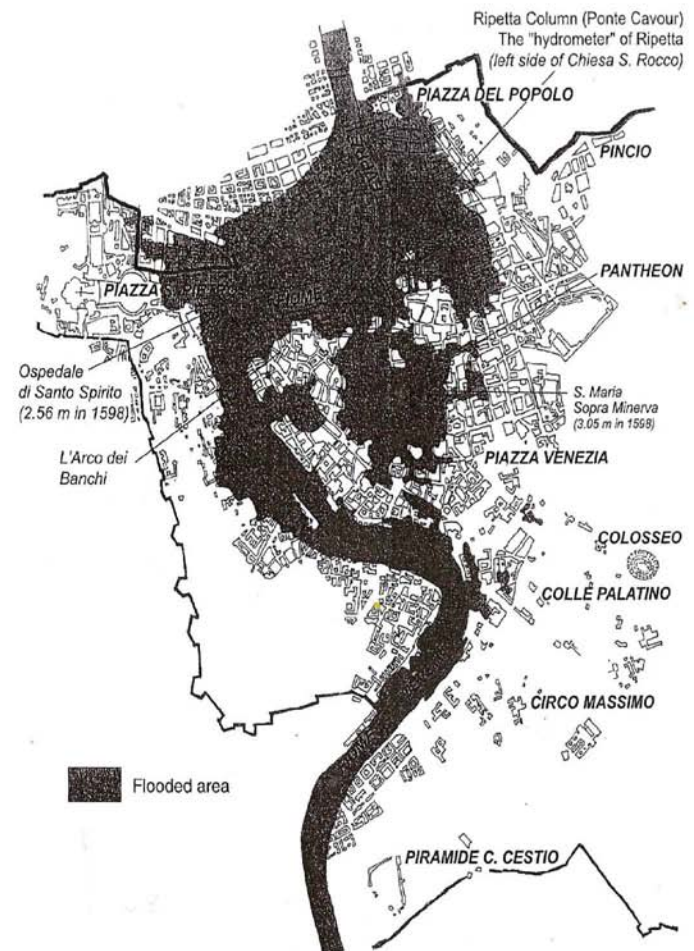
Flood map of Rome (1870)
From: The Seven Hills of Rome: A Geological Tour of the Eternal City. 2005

Istanbul's historical approach to its neighboring bodies of water—the Golden Horn, the Bosphorus, and the Sea of Marmara—emerged as much in response to political forces as it did for hydrological ones. The surrounding water was the image of the city from its foundation by Constantine in ACE 330 to the establishment of the modern Republic of Turkey in 1923. During the nineteenth century Istanbul city planners regularized the use of the waterfront along the peninsula as a means to increasing trade and marine traffic, reducing public health risk due to poor conditions in the bay, and enhancing the city's public image. The surrounding water networks also played a crucial role in the city's development of transportation routes to Europe and Asia through a series of ferries and boats. This concern with water traffic is evident even in the layout of the existing city street network that has all main streets touching the embankments. (Celik 1986, p.73)

Water has served other important roles in the urban planning of Roman cities, part of which has involved the claiming and importing of a readily accessible source of drinking water. As with Rome and Istanbul, Los Angeles lacks sufficient water sources for potable water available within its city limits. Consequently, an ambitious and costly plan infrastructure has been built to brining this a resource to the city. Such plans have required an enormous amount of political lobbying and funding that have enabled three major aqueducts to supply the county of Los Angeles. Among them is the Los Angeles Aqueduct engineered by William Mulholland. Mulholland supervised the entire project which lasted a total of nine years when it was finally completed in 1913, even though its expansion continued well into the 1970's. Through persistent political manpower, the project was approved with a price tag of $23 Million, an equivalent to today to $27 Billion. The aqueduct would be one of the first to bring 560,000 acre-feet a year of water from 233 miles away from its source. (Carle 1950, p. 115-118) and (Green 2007, p. 32-51)

Such waterworks, however, often do not reflect an area's true ecological and infrastructural conditions, but portray an idealized condition. Los Angeles is by far one of the most complex cities west of the Mississippi faced with a real water issue. It is a mirage of liquid realities, a desert masked as an oasis. From Pasadena's Arroyo Seco to natural springs in palm desert, Los Angeles County and its environs is a place where abundant supplies of crops, which rely greatly upon rain, grow in the middle of an arid landscape. This great disconnect is evident throughout the urbanization and planning that has created sprawl and consequently desertification of the American west. It is also evident in the city's portrayal of its water systems by hiding the infrastructure that has enabled such growth and expansion of today's thriving metropolis. As Marc Reisner points out in Cadillac Desert, the American west appeared as a place where technologies could be perfected, and where the spirit of adventure could transform our pre-conceived notions of what can be built and where. (Reisner 1993, p.1)

Aqueduct channel in southern California
(Cesia Lopez 2010)

Plan of the aqueduct and stone conduit

A

B

C

28 cm

86 cm

86 cm

86 cm

Guide to the Aqueducts of Ancient Rome by Aicher, Peter J
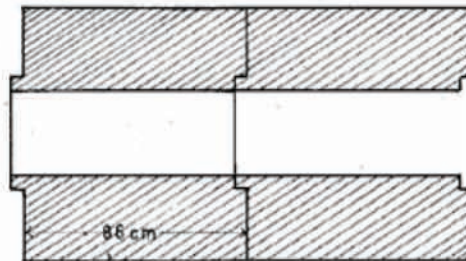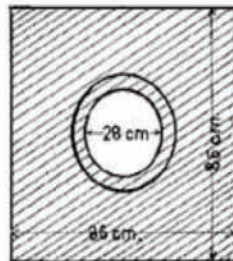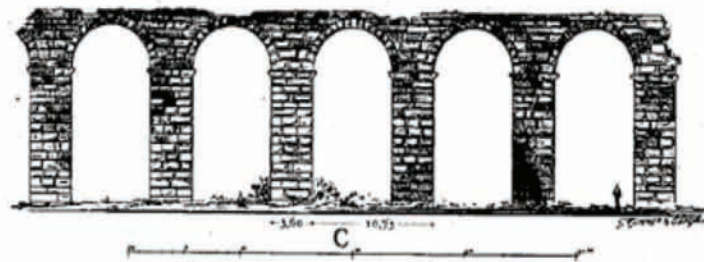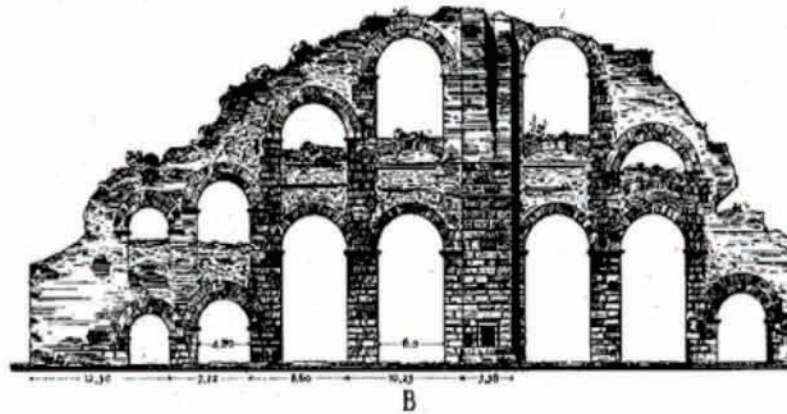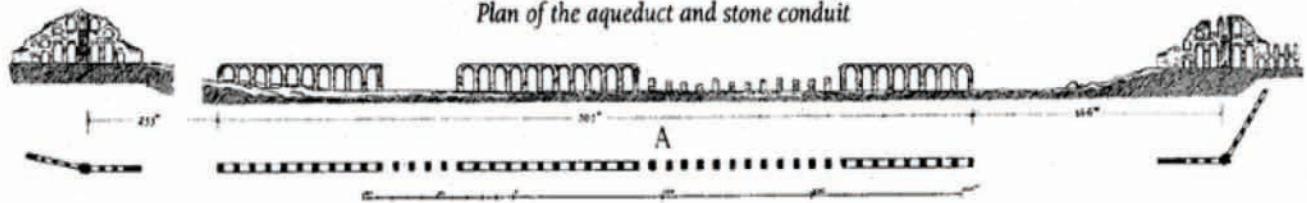
Rome, on the contrary, manifested its hydraulic engineering with intentional displays of power and sublimity. Aqueducts such as the Aqua Virgo, also known as the Aqua Virgine, have become emblems of power through the ornamentation of systems that display the water's might and awe. These displays are manifested in Public Fountains or Mostre such as the Trevi Fountain, which encapsulate beauty through its representation of classical art and architecture while representing the authority of heads of state, governmental and religious powers such as Popes and Emperors. (Rinne 2010) Other less touristic, but nonetheless significant symbols are the aqueducts, the remains of which litter the surface of contemporary Rome. For example, the Aqua Neronian and Claudio are still evident through the long spanning arches that are visible and deeply embedded into the urban fabric. Although such systems no longer are in use, their sheer presence and size restore their historic relevance and contribution to the city. In other words, it is in the "shaping large landscape forms for human use; contrasting formal and informal design natures; controlling water as an element of design" that the Romans were able to affirm their power in Imperial Rome while at the same time have their legacy last through the ages. (Yegul 1996, p.3)

As in Rome, Istanbul's long spanning and powerful pieces of infrastructure clutter an urban fabric that has developed spontaneously and with little regulation. Due to constant fires that have broken out within the city's winding streets, Istanbul has had to rebuild itself over time depending heavily on its local craftwork. Such has been the portrait of the city whose only remaining visible aqueduct, the Valens Aqueduct, still stands monumental among one of its busiest streets, the Ataturk Bulvari. During the twentieth century, water infrastructure was laid out and developed in the conventional sense with sewage lines and other infrastructure work being completed simultaneously along with a new city grid. Even modern day Istanbul continues its infrastructural work with the upkeep and

conservation of monuments that range from the epic Haggai Sophia to the Kaiser Wilhelm II fountain located at the Hippodrome. (Celik 1986, p.73)


Kaiser Wilhelm II Fountain in Istanbul, Turkey
(Cesia Lopez 2011)

View of the Hagia Sophia with the Bosporus on the background in Istanbul, Turkey (Cesia Lopez 2011)

Water infrastructure played an important role within the city walls of ancient Constantinople during the reign of the Roman Empire. Emperor Valens completed the Valens aqueduct in 368 A.D. as a means of alleviating the increasing water problem, or lack thereof, due to a growing population. Despite Constantinople's nearness to water, it lacked available resources of fresh water, and like in Rome, aqueducts were commissioned for construction. Secondary means of securing fresh water were also built in the form of a series of cisterns spread throughout the city. Some of the cisterns were located underground while others appeared above ground as open reservoirs. These reservoirs were later converted into public parks as the need for open space

was addressed. The most famous examples of these cisterns are the Basilica Cistern or Yerebatan Cistern located in the heart of historic Istanbul. The cistern was constructed in the late 4th and early 5th centuries and has stood the test of time, and of powerful empires. Its main source for water was the Hadrian and Valens Aqueducts, and it was responsible in supplying both the Grand Palace and the Haggai Sophia. As the threat of rivaling empires dwindled during the Byzantium Empire and later during the Ottoman Empire, the cistern was used as a university (7th and 8th centuries A.D.), library (4th century A.D.), and court of law (6th century A.D.). (Cinic, Yazici, Köze, Diabank, 2003)
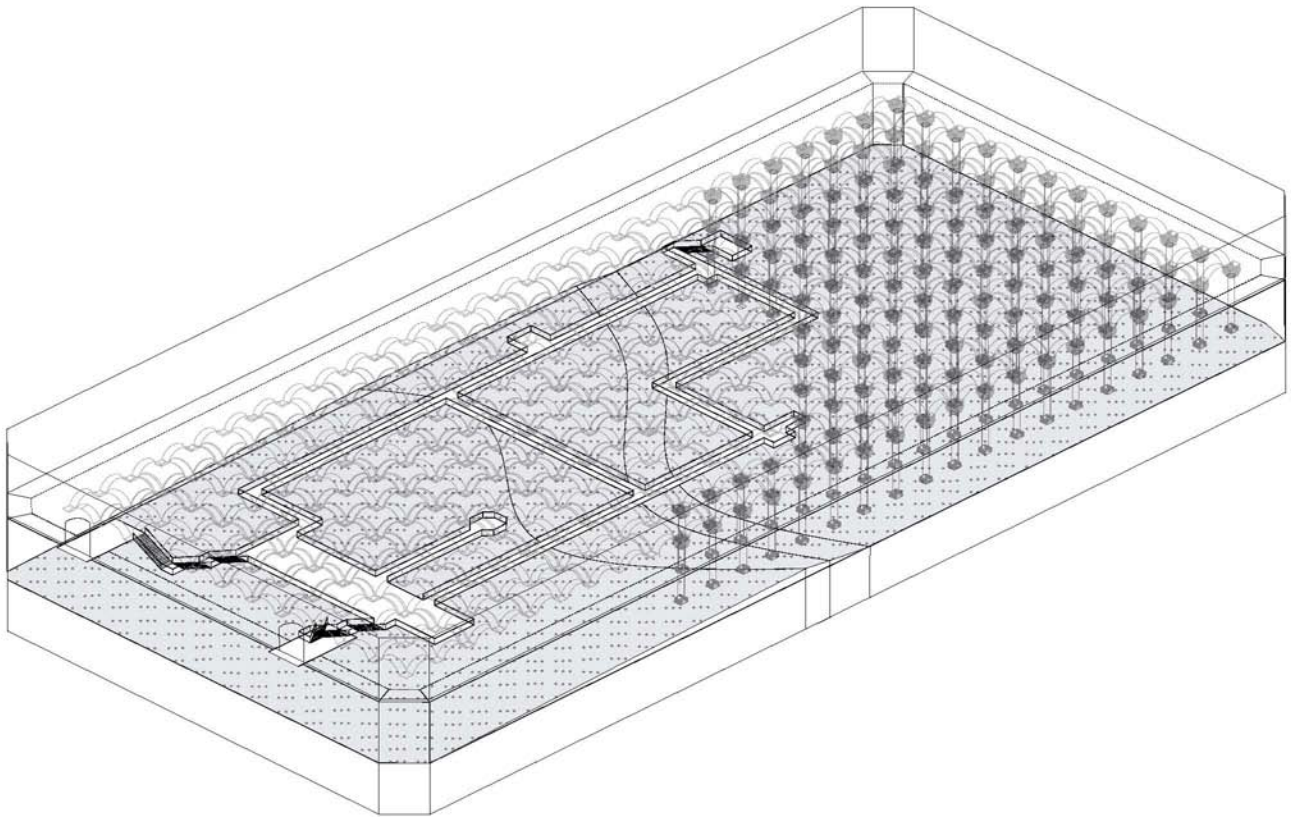
Basilica Cistern; Istanbul, Turkey (Cesia Lopez 2011)

This duality in use of program in a water infrastructural system is common even in today's society, where a populated plaza ornamented with a historic water piece is displayed with pride during a major civic event. The integration of system and public space is especially evident within a ritualistic discourse. This is particularly apparent in the Islamic world, where the ritual of cleansing is closely tied to religious ceremony and consequently major civic works such as mosques. The ceremonial act of washing is an important mandate during ritual ablution. The necessity of the pious to purify themselves before worship was stressed within Islamic law and consequently had an effect on the design of religious buildings. The integration of ablution fountains, pools, and baths within mosques enhanced the overall experience of the pilgrim who once arrived in a sacred space needing to completely cleanse the body through washing. Ablution fountains, for instance, are some of the most obvious symbols within such religious rituals. Ottoman mosques follow a linear design of these fountains that are arrayed against a wall, whereas other structures typically have a pool or elevated fountain in the middle of the courtyard. (Sheila and Bloom, 2009; p.18-19)

The integration of water and architecture holds a significant position in buildings through the development of spatial, material, and technological design solutions. For example, Roman baths often were associated with the latest technology, such as curvilinear vaults constructed in concrete, sub-floor heating systems, or solar orientations for thermal efficiency. Imperial baths in particularly were also considered as major social spaces that allowed for the mingling of classes while enjoying the ritual of bathing. As Fikret Yegul describes in Baths and Bathing in Classical Antiquity

Bathing in the ancient world, especially in the world of the Romans, went far beyond the functional and hygienic necessities of washing. It was a personal regeneration and a deeply rooted social and cultural habit-in the full sense of the word, an institution. For the average Roman a visit of the public baths in the afternoon was an irreplaceable part of the day's routine…As the direct inheritors of the Greek gymnasium and the Greek ideal of a balance between body and mind, the Romans sought to incorporate an intellectual dimension into the wide scope of their bathing activities. Many of the larger bathing complexes contained lecture halls, libraries, and promenades… The leisurely and sensuous world of Roman baths-eating, drinking, massage, or simply the pleasures of companionship in an intimate and luxurious setting- interests us.(Yegul 1996, p.1)

Bath of Caracalla,Rome
(Cesia Lopez 2011)

In Ottoman design the association of water and architecture was represented in the technology incorporated to supply water into the building, as well as the cooling implications that water would have on the overall conditions of the space. This was evident more in the regularization of temperature in the building than in the design of dome-like structures that behaved as a cooling tower, raising the hot air and introducing cool air, where water would behave as a cooling system to the room. Usually water would be collected into a pool that was located in the center of the room directly below the oculus of the dome that would be fully exposed to natural environments.

Tapping a source outside the building, usually a well or enclosed cistern, water would be channeled through a closed pipe system and delivered to the pool. This pool would then be decorated with a series of symbols engraved into the surface of the concrete, and could take the form of a running fountain or deep enclosure. This type of system is evident in buildings such as the Inceminareli Medrese Rolovesi located in Konya, Turkey. Structures located in rural areas with little or limited water depended on available resources of hydration such snow. This is evident in the Esrefoglu Mosque located in the high mountains of Konya, where a seemingly empty pool is located in the center of the mosque only to be filled by the snow that would enter the space through an opening in the ceiling. The moisture of the collected snow is thought to have helped in maintaining the structural integrity of the wooden pillars constructed in 1299 A.C.E. . that would have otherwise cracked due to drying conditions. (Zaman, 2011)

Smaller scale water systems were used to ornament everyday settings through infrastructure that became spectacle. These almost banal systems were carefully designed, adorned, and strategically placed within the city as constant reminders to the general public of powerful patrons responsible for providing drinkable water. These reminders take the form of public

fountains that decorate the winding streets of Rome and Istanbul and hold particular characteristics of their own from classical art to symbolic representations and gestures. (Rinne, 2010) Fountain houses in Istanbul replaced, sometimes literally, the baroque fountains associated with Rome. These also became emblematic of "political and aesthetic" conditions often associated with the pious patronage of "sabils" that were so linked to charitable acts. (Sheila and Bloom, 2009; p.162-63) In Ottoman Turkey, "symbolically speaking, water occupied a prominent place in the public ritual of the Ottoman court, in the visual and literary imagery of both religious and secular art…" and these were evident in sabils whose use was as essential as the water it held. (Sheila and Bloom, 2009; p.189)

Esrefoglu Mosque; Beysehir, Konya
(Cesia Lopez 2011)

Source of water from well or enclosed cistern
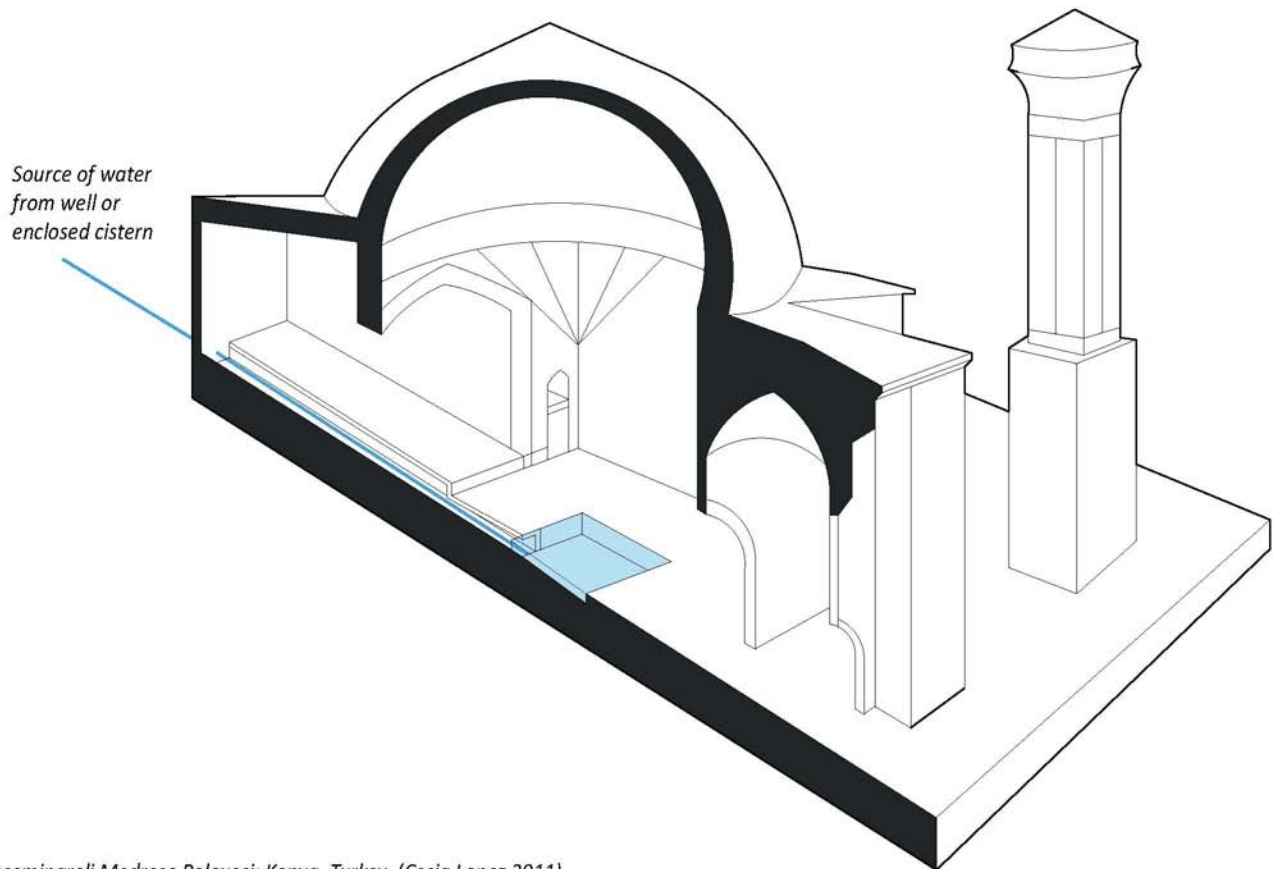
Inceminareli Medrese Rolovesi; Konya, Turkey (Cesia Lopez 2011)

Visible Flow of Infrastructural Lines

Aqua Claudia and Neroniani
Rome, Italy

Valens Aqueduct
Istanbul, Turkey

*Photograph by Heath Speakman*

Los Angeles Aqueduct
Los Angeles, CA

Rome

Mapping:

In "Heuristic Nolli Map: A Preliminary Study in Representing the Public Domain in Urban Space," a study from two doctoral candidates from Harvard and MIT, it is proposed the defining of the "public domain," through the use of GIS and other techniques as ways of assessing the "publicness" of a space, the authors map unperceived information such as tax assessment data or social, racial, and economic datasets. These datasets begin to illustrate the degree of public space within an area that are often omitted due to the lack of physical perception. This form of investigation is regarded as a "Heuristic Nolli Map." According to the authors, the Nolli map represents a perceived" or experiential public space that today holds little relevance due to the complex dynamics affecting the delineation of the public space such as private owned-public and public owned-private.

Giovanni Battista Nolli, an architect and printmaker famous for his map of Rome, depicted the complex fabric of the city by focusing on the representation of public and private domain through a graphical technique of a positive and negative space. (Ceen 1989, p.17) By coding public space as a void, Nolli outlined and detailed major spaces that had significant publicness associated with them. Such spaces include major piazzas and archeological sites, open areas, and religious places of worship such as basilicas. By portraying the private space as a solid, Nolli coded Rome as a uniform entity that, to borrow from in Kevin Lynch, began to emphasize paths, edges, districts, nodes, and landmarks as physical forms that allow perceptual navigation through the city. (Lynch 1960)

Through manipulating Nolli's map one can obtain a new perceptual reading of Rome that, through a strategy of inversion, depicts public as voids and private as solids, illustrating the private as residual zones while portraying the public as inhabitable space.

By further developing this idea, a new condition can be added in the form of Rome's water infrastructure. Graphically minimizing the common urban physical forms and emphasizing the otherwise secondary systems, a new formal language can be perceived through a depiction of Rome's major waterways as predominant sources for traversing the city. This illustration can be used to determine parallels in the integration of a third condition. The first condition would be the built environment, the second would be the piazza or the obvious public forum, and the third would be the imposition of the ancient infrastructure interpreted as opportunistic areas of design intervention.
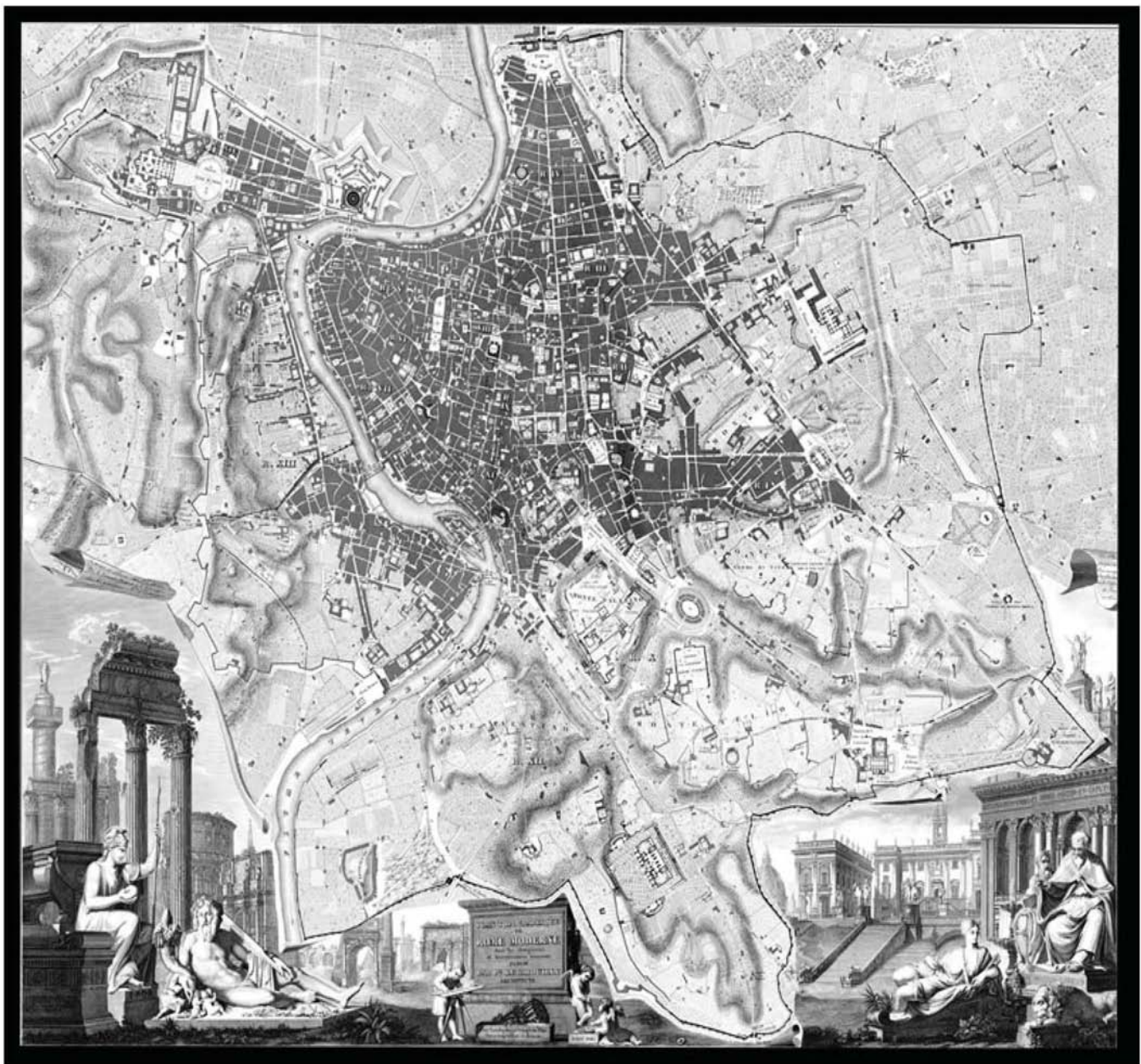
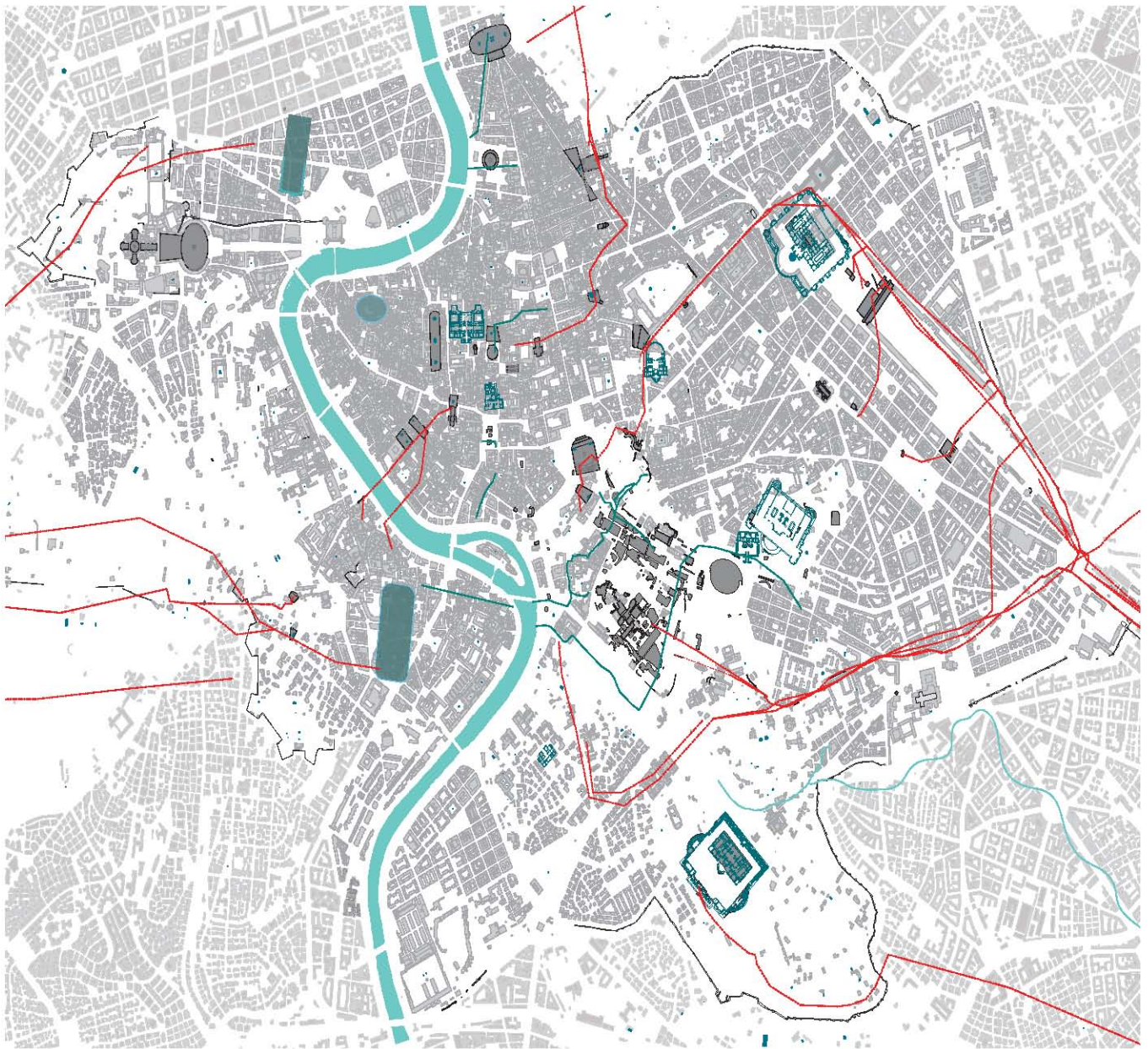*1748- the Grande Pianta di Roma di Giovanni Battista Nolli*

Original Nolli Map depicting the Historical center of Rome.


Manipulated Nolli map.

*Map of modern day Rome depicting the urban fabric.*

Imposition of the ancient infrastructure unto the urban fabric can become possible areas of design intervention.

Drawing as Representational and Design Technique:

The delineation of objects or situations can emphasize themes or can reveal otherwise unperceived conditions. By using drawing as a method of uncovering and the means of generating design, a series of techniques documented and interpreted two major aqueducts in Rome. The imposition of ancient Roman infrastructure into contemporary Rome evokes nostalgia for ancient water systems. This technique is a provocation of soliciting and engaging monumental scaled systems as architectural and urban forms. It offers a counterpoint to Los Angeles's constant burying of its significant and powerful water systems, often manifested through long, distant channels in barren landscapes or buried in pipes throughout the city. It is what Reisner calls the emptiness of "isolated mesas and buttes broke the wind-haunted distance...going nine miles a minute that was a lot of uninhabited distance in a crowded century, a lot of emptiness amid a civilization whose success was achieved on the pretension that natural obstacles do not exist." (Reisner 1993, pg.1)
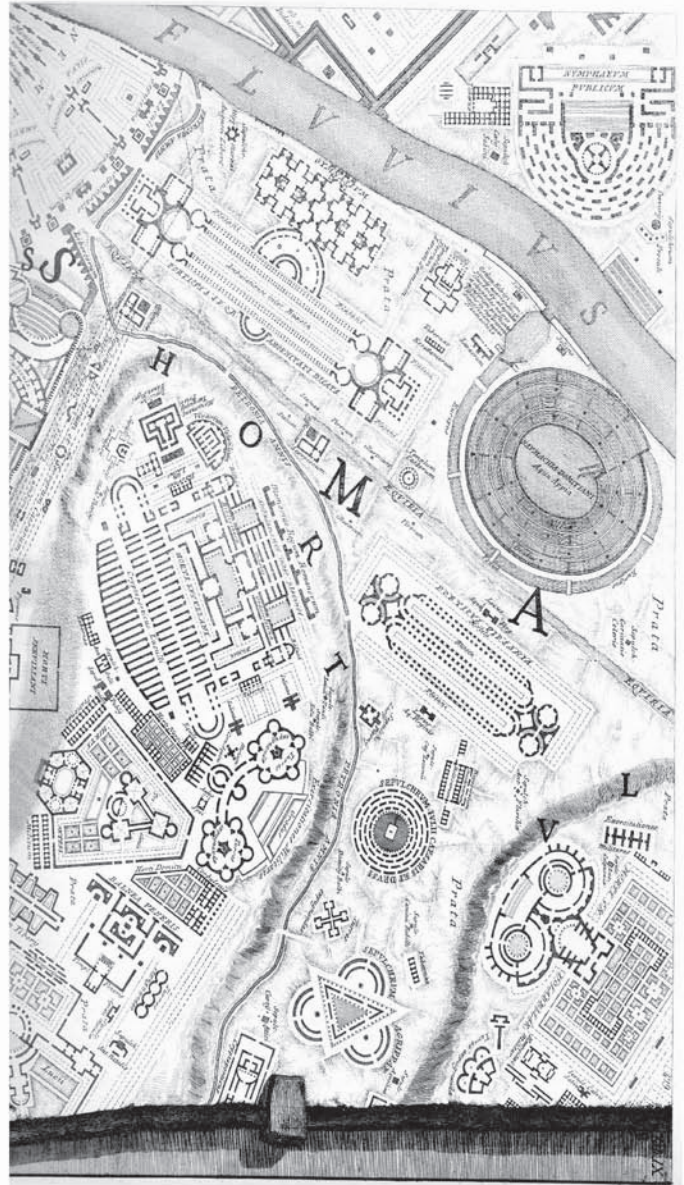
1762- Campo Marzio di Roma antica di Giovanni Battista Piransesi: zona degli Orti di Dolabella, di Lucullo e del Mausoleo di Augusto
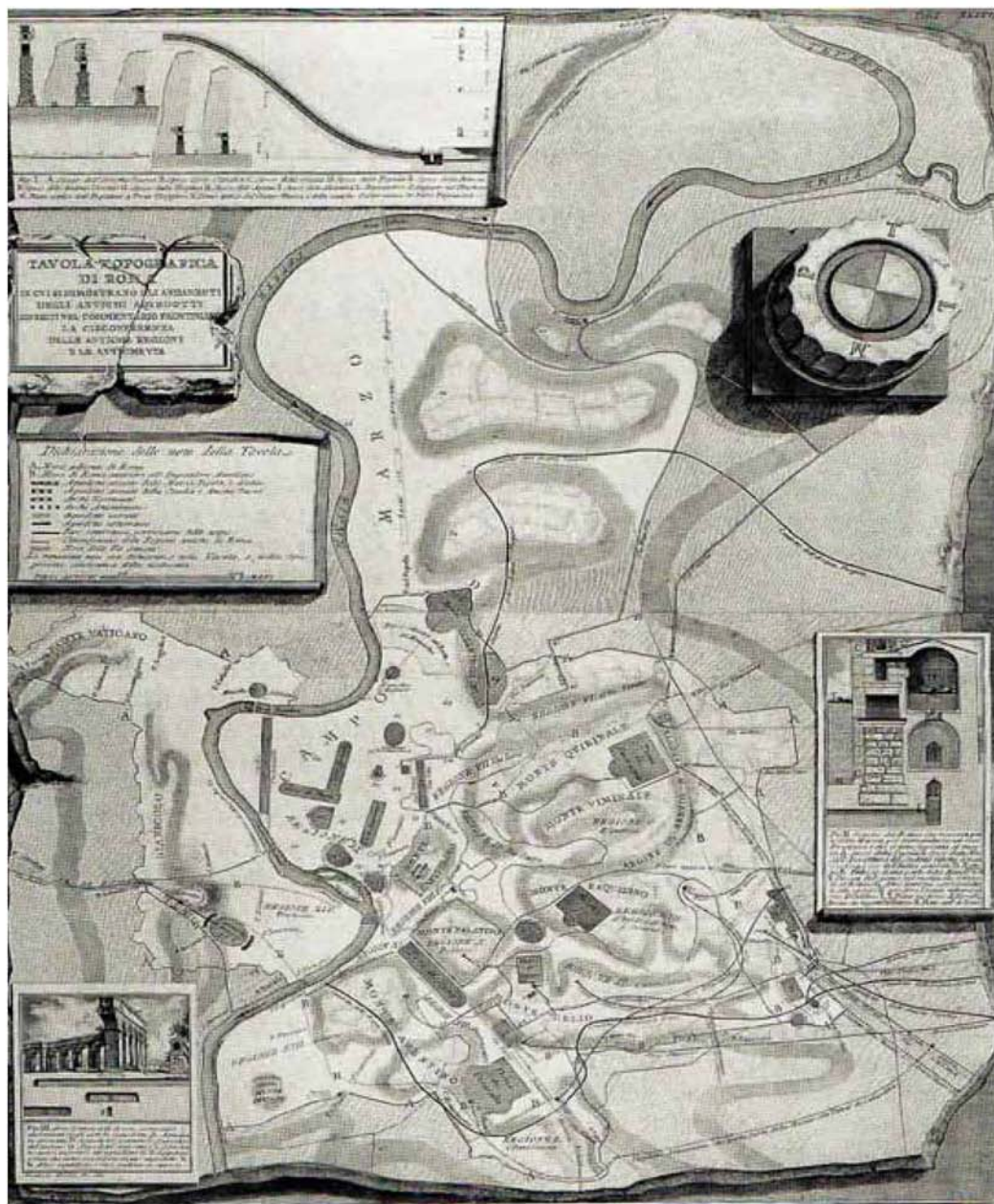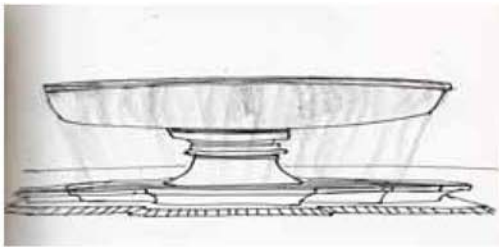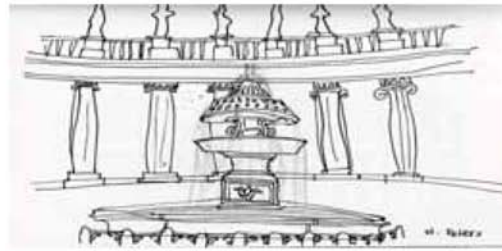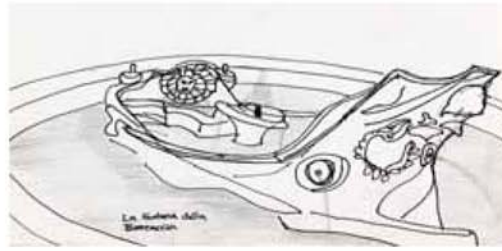
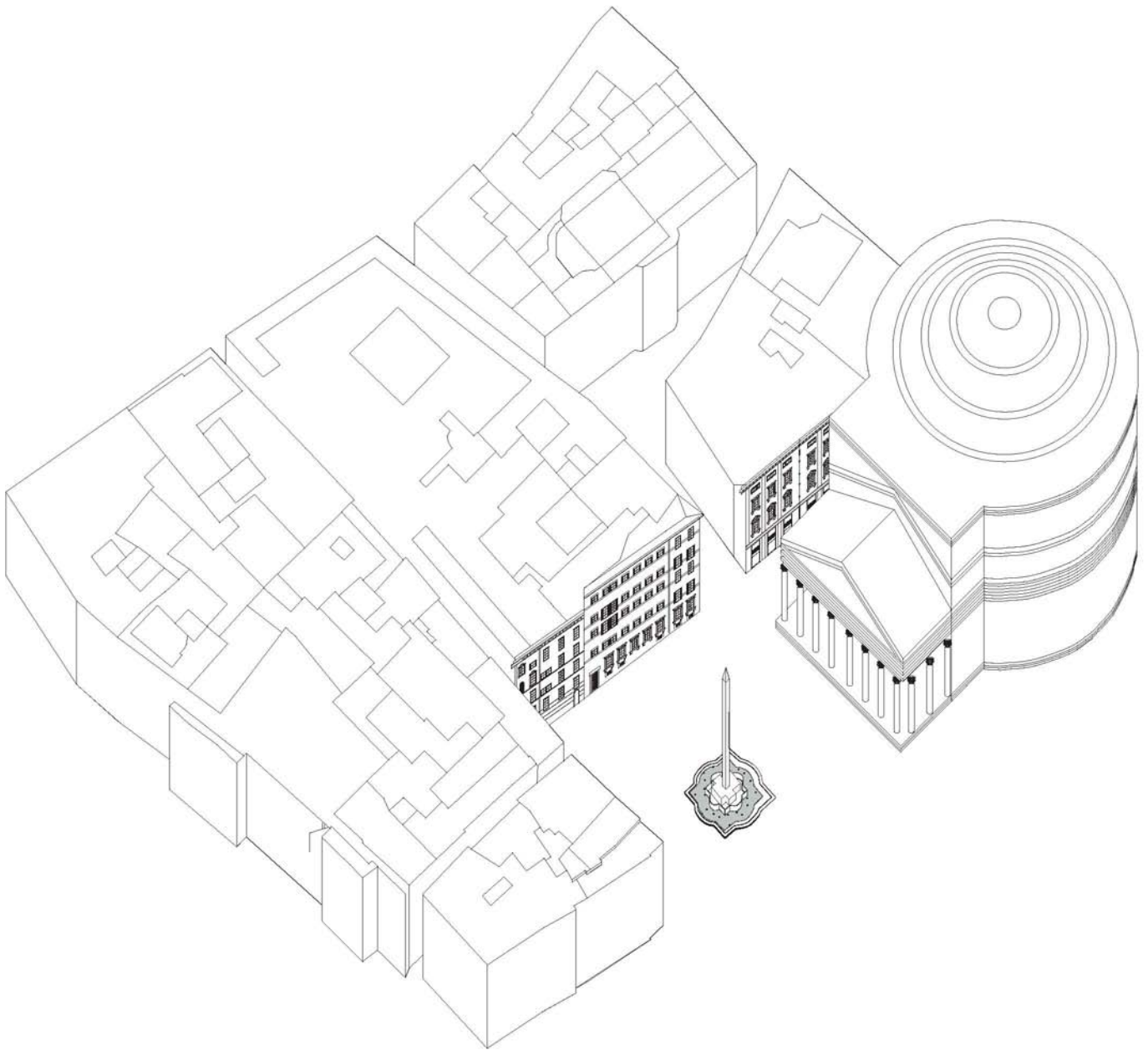*1756 / 1774- Tavola Topographica di Roma di Giovanni Battista Piranesi*

The Mostra and the Urgency of Water Access
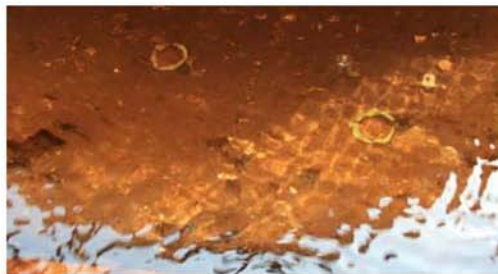
Photographic study of famous fountains in Rome
(Cesia Lopez 2011)
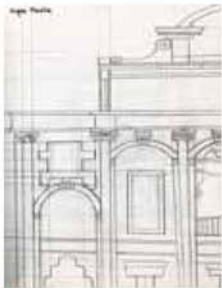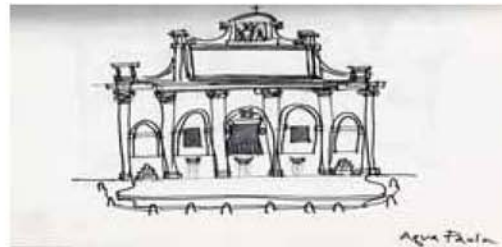
Drawing study of famous fountains in Rome
*(Cesia Lopez 2011)*

Fontanella di la Rotanda –in Piazza di la Rotanda faces the Pantheon and is one of Rome's ornamental fountains designed by Giacomo Della Porta in 1575. These decorative fountains often served as public reminders of wealthy patrons who contributed in providing public access to water.
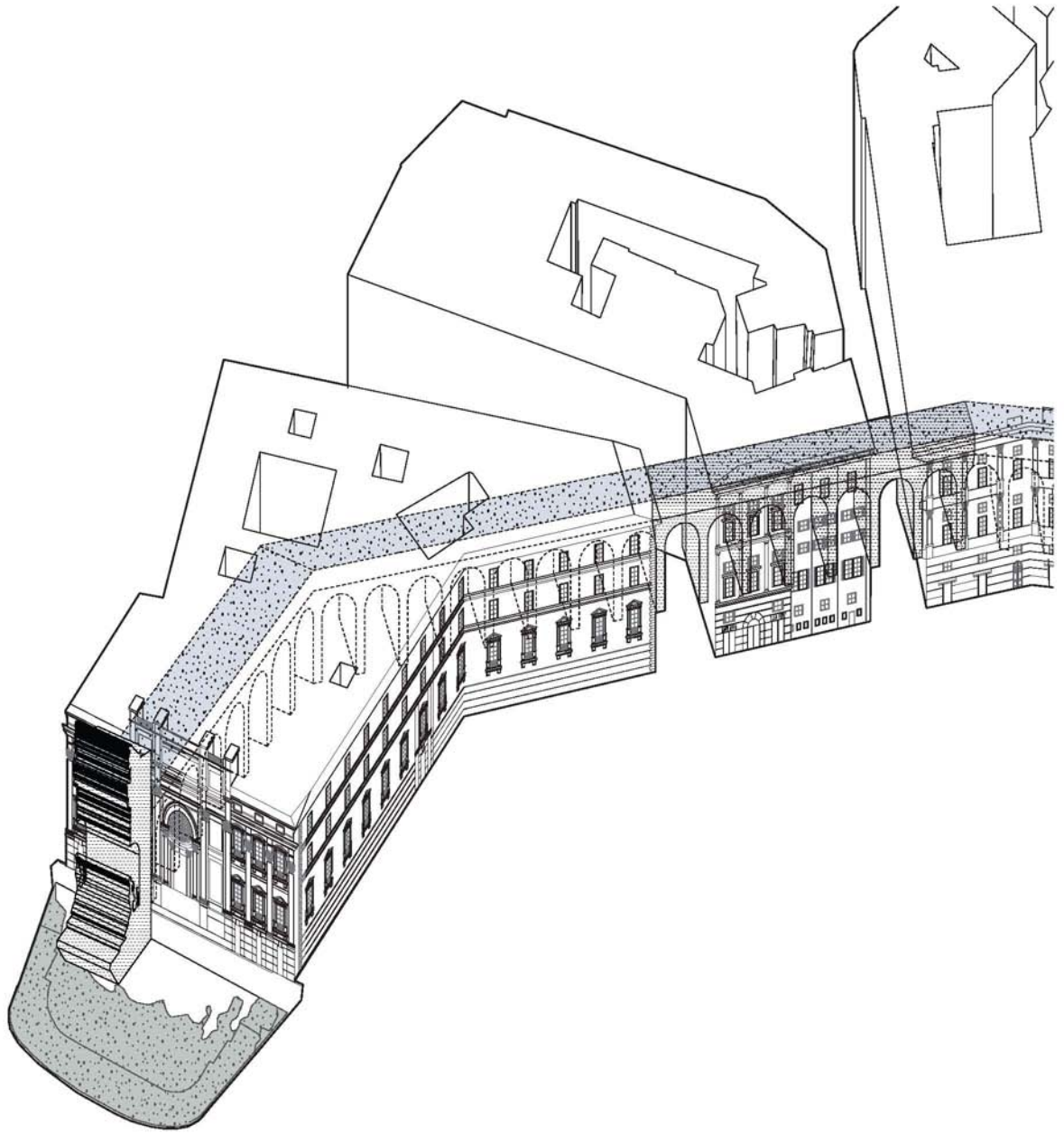
Fontana di Trevi – was a terminus to Aqua Vergine; its main water source. The fountain acts as indicator of high and low volumes of water due to seasonal changes in precipitation.
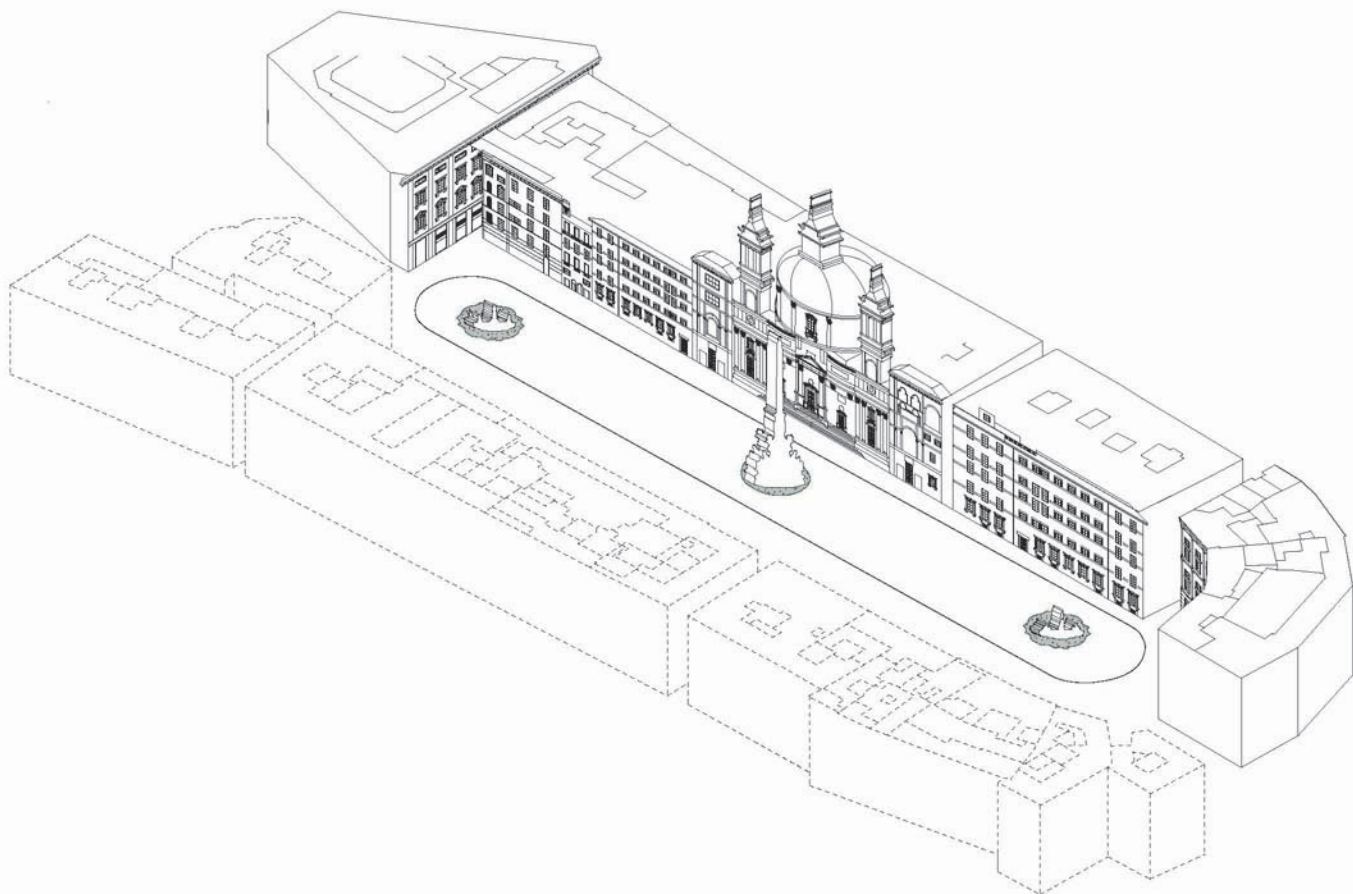
Il Tritone, Fontana dei Quattro Fiumi, and Il Moro- in Piazza Navona became emblematic of public works and design as both the decoration of each fountain, along with the designated amounts of water from Aqua Virgine, contributed to the overall effect of the piazza as a public forum.
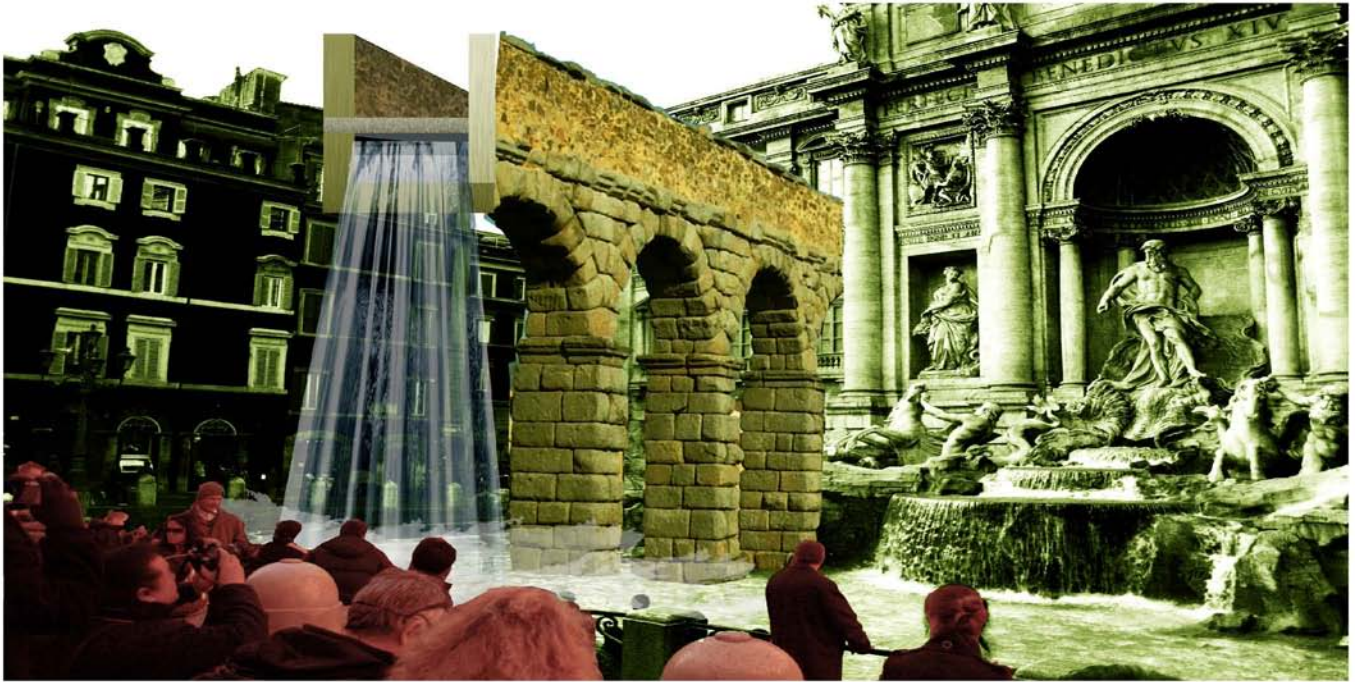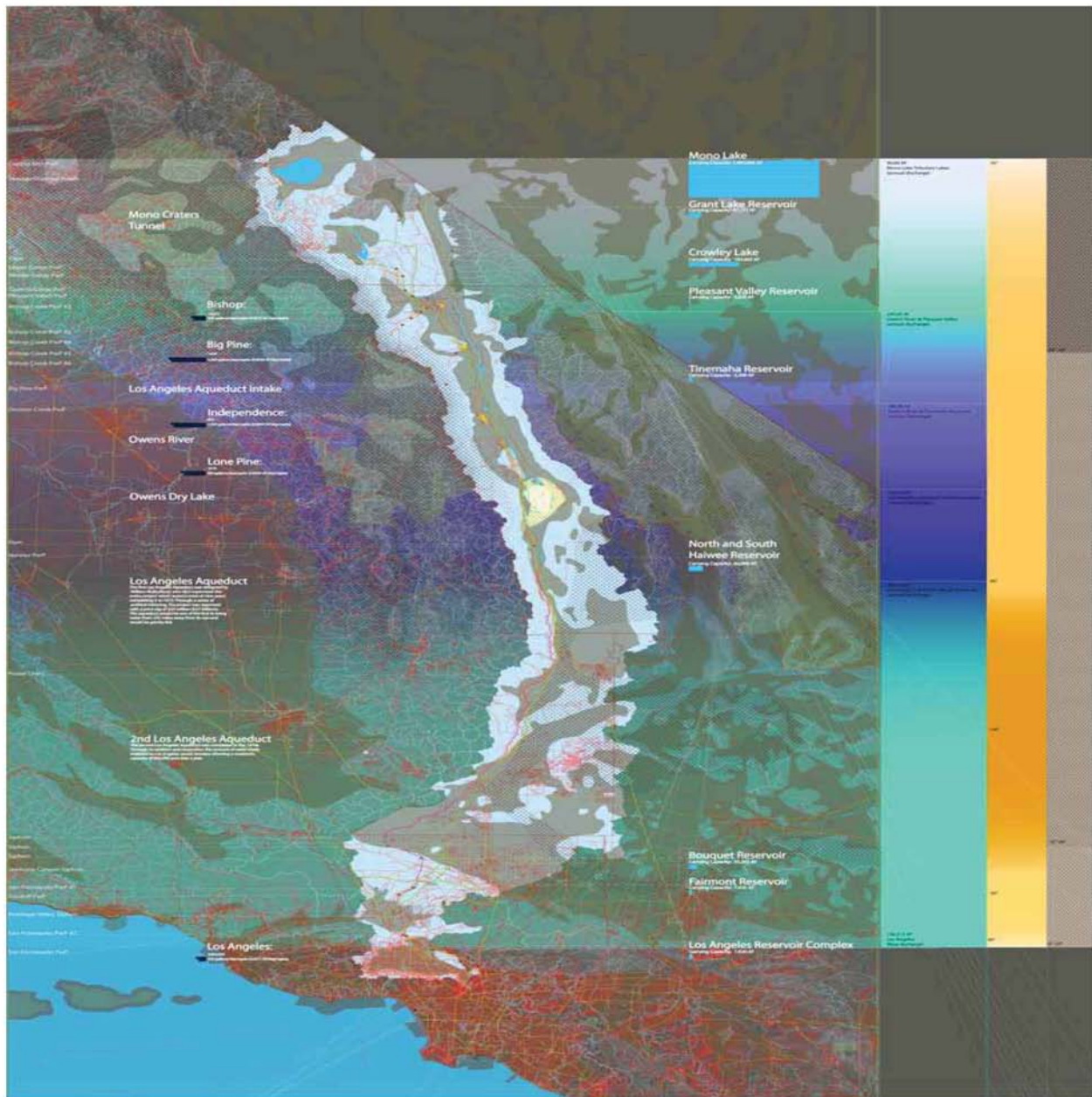
Aqua Virgo

Section Cut:

The first technique applied in the delineation of the Aqua Virgo was the production of a section cut. The path of the aqueduct was represented as a singular cut line traversing through a series of diverse buildings all represented through their elevational status. The path traced was limited by establishing boundaries through the depiction of two major public spaces. Unlike a previous depiction of the Los Angeles Aqueduct, the focus was placed on a moment of the aqueduct where visible traces and major monuments intersected. The second technique was to unfold a sequence of planes through their projection into a two dimensional surface. (see section cut line diagram.) Such projection layered two existing, or previously existing, conditions upon the urban fabric. The placement of the aqueduct as a supplemental

architectural layer allowed for the interpretation of a new condition depicted as space described through the use of shadows. Finally the unfolding of a three dimensional space onto a two dimensional surface characterizes the urban conditions as an uninterrupted processional link.

Color Coding:

By following Rodolfo Lanciani's technique of establishing a color code for the interpretation of his Forma Urbis Romae, a color palette has been adopted to represent the layers that make up the area of intervention. Similar to Lanciani's, the drawing follows the following color definitions:

- Black = existing conditions
- Red = ancient buildings
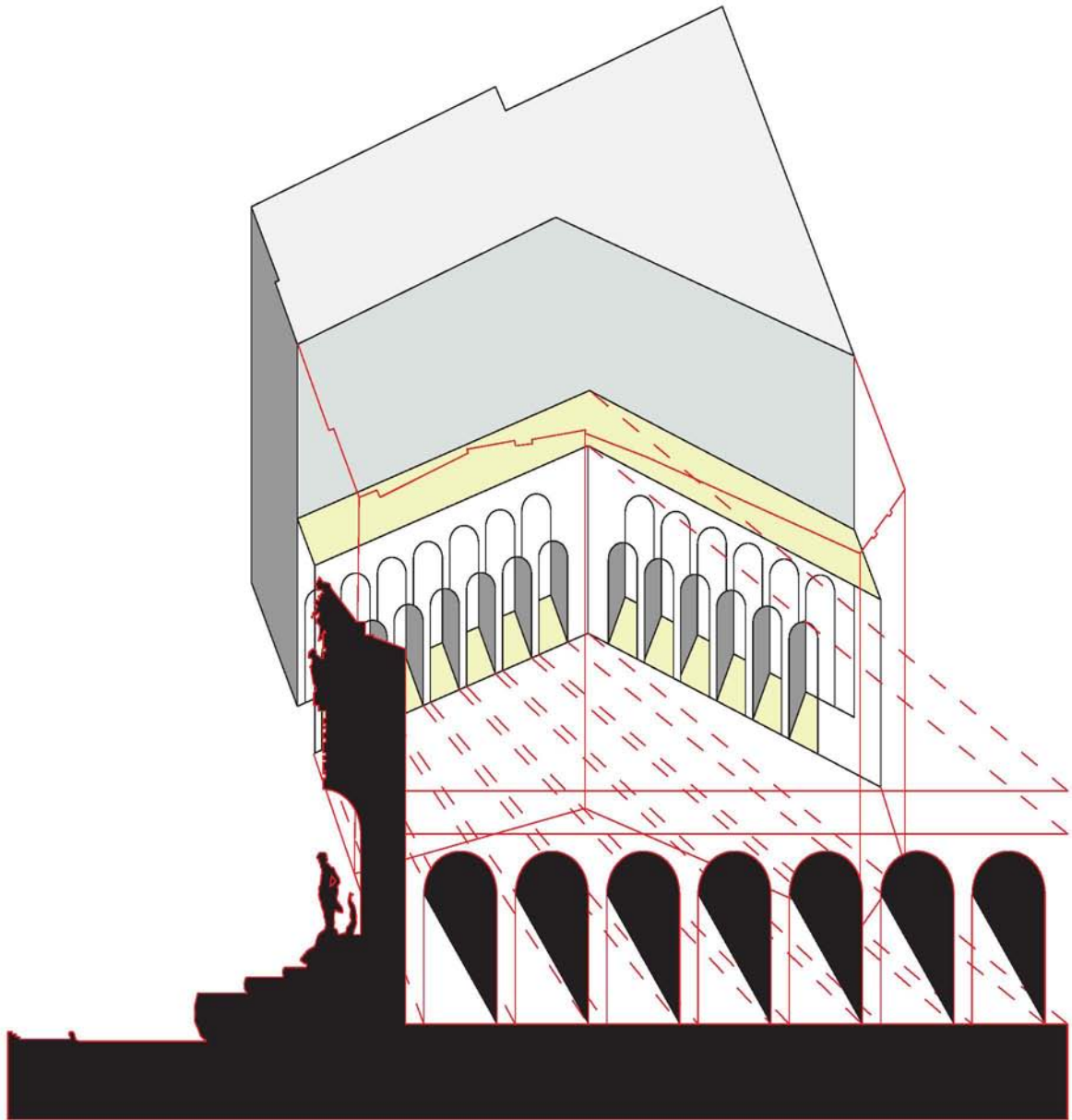- Blue = water and future projected space

Los Angeles Aqueduct Map: Hydrological Exploration
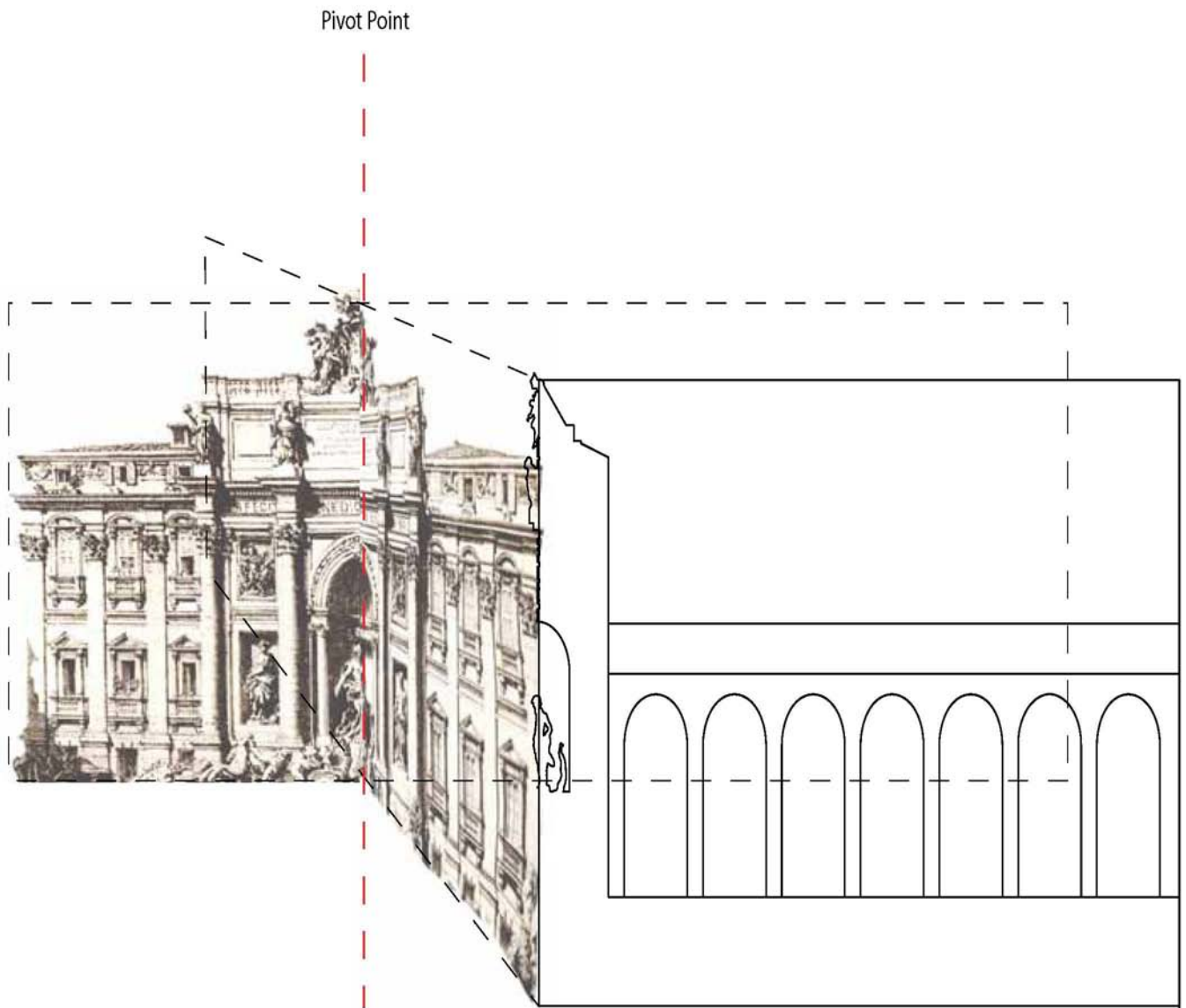*(Cesia Lopez 2010)*

1893 / 1901- Roma antica di Rodolfo Lanciani: Forma Urbis Romae

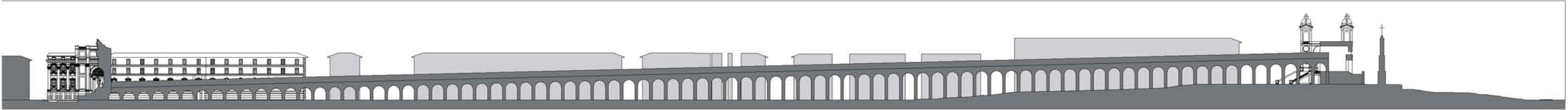*Traced path of the Aqua Virgo with projected elevations.*

A two dimensional representation of spatial conditions projected through the incorporation of the Aqua Virgo.
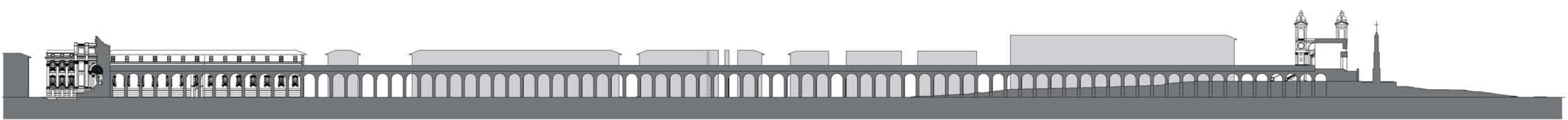
Pivot Point

Pivoting points determined through the folds of the aqueduct path's are used as hinges for the unfolding of planes.
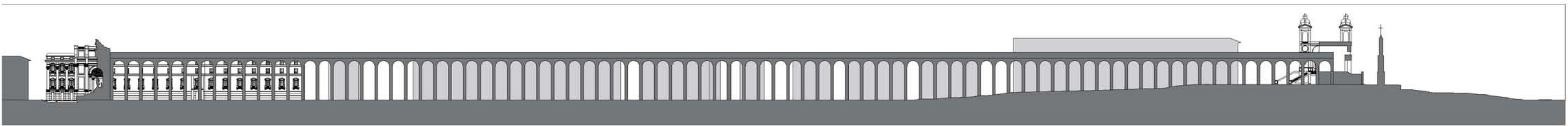
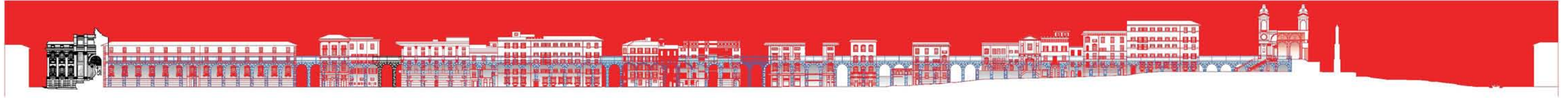Path of the aqueduct from Piazza di Spagna to Fontana di Trevi

Path 1: accelerated decent with an increase fall ratio

Path 2: ratio of 0.5% decent as determined by Vitruvius

Path 3: constant ratio following highest elevation marker

Path of the aqueduct is coded to create tension between the ancient infrastructure and the present urban condition.
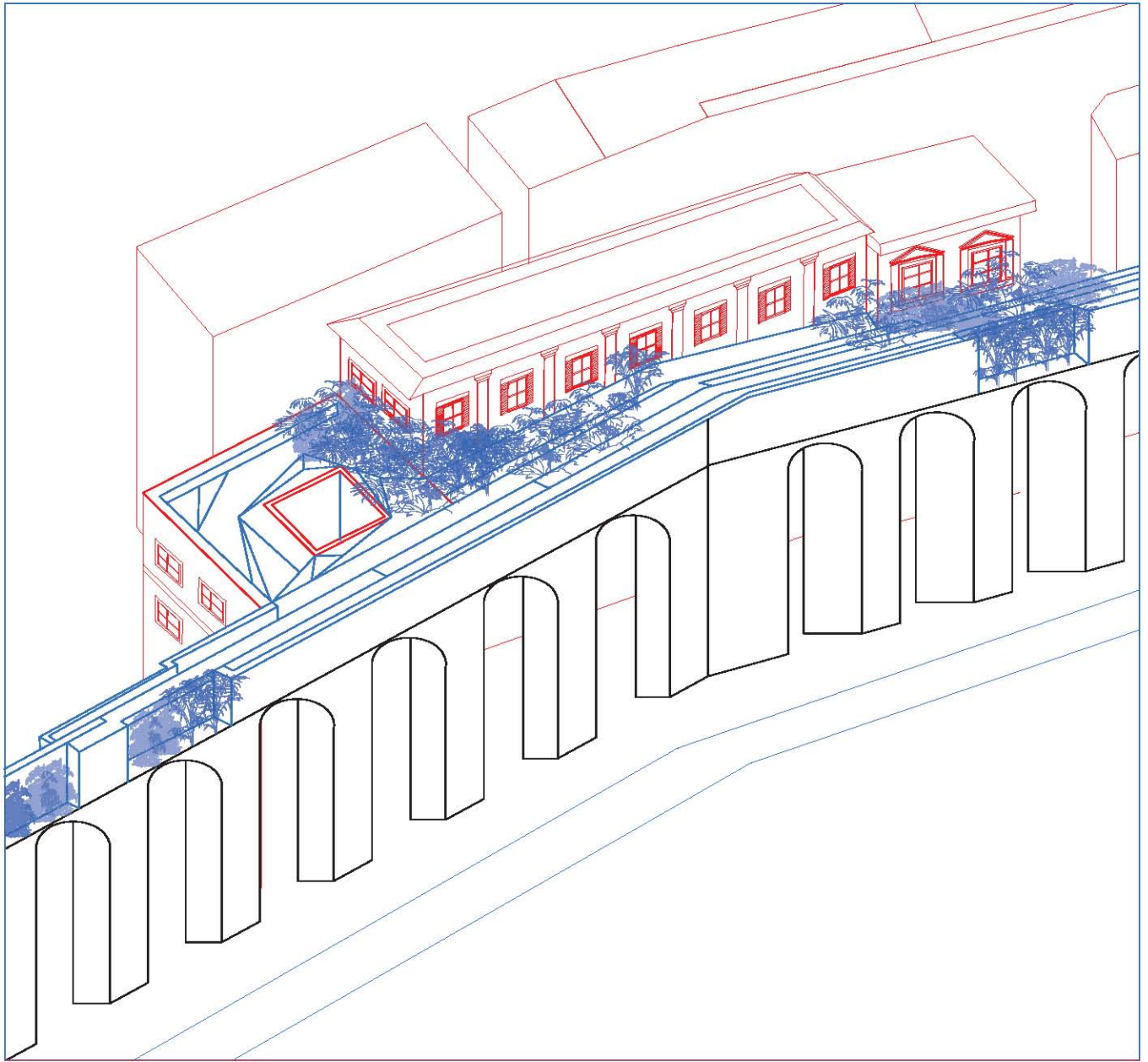
Aqua Claudio and Neroniani

The aim of depicting the Aqua Claudio and Neroniani was to emphasize the aqueduct's complex relationship with the existing urban fabric. The same color coding was used to represent existing, ancient, water and future space as the path of the aqueduct was traced. The focus in drawing the aqueduct was not to trace the aqueduct to its source, but to represent the major public spaces involved within a path linked by two major landmarks. This representation was visualized in the axonometric plan which illustrates current as well as possible urban conditions. By focusing on two major areas, the aqueduct was represented as a potential and viable site for a new urban design intervention that provides for a newly defined public space.
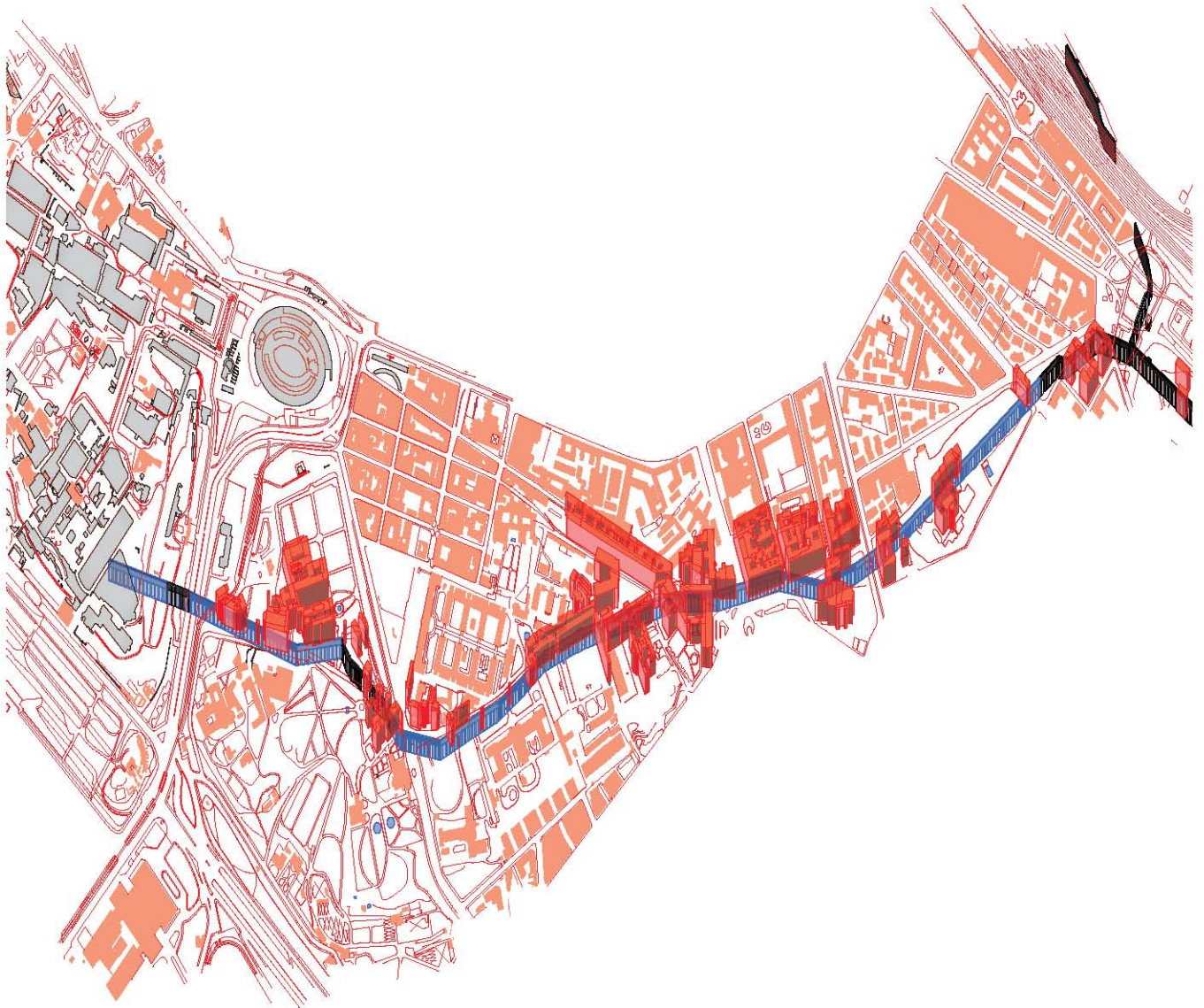
Path of the Aqua Claudio/Neroniani and its relationship to the urban fabric.

Intervention 1: Using the Aqua Claudio/Neroniani as open space linking buildings attached to the aqueduct. .
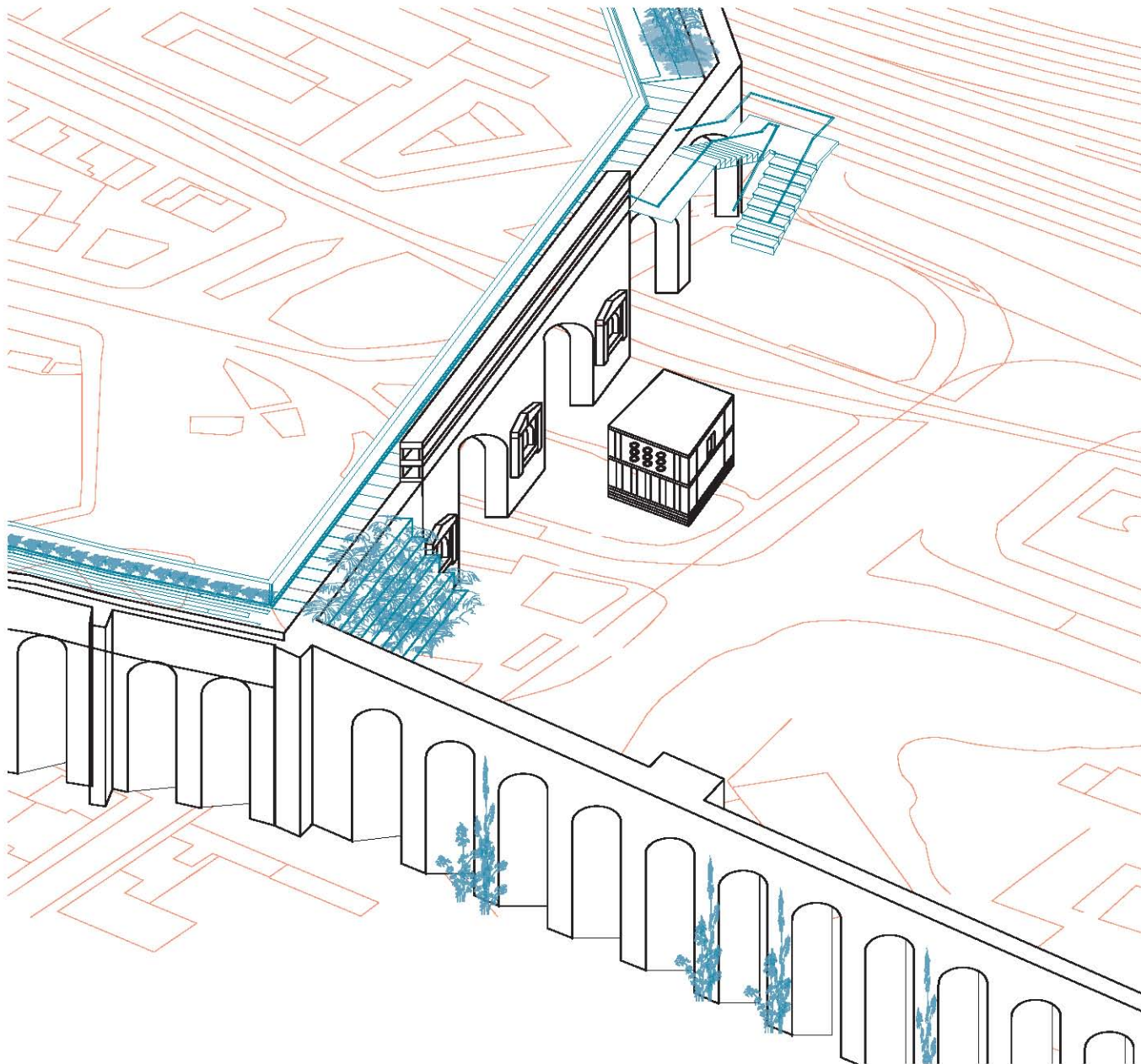
Intervention 2: Restoring significant areas such as the Porta Maggiore as points of accessibility.

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