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***Urban Renewal Evaluation Using ArcView
 and Integrating CAD, Spreadsheet, DB***

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Abstract

Key Words

1. Forewords. Introduction
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3. Economic Power of Territory (EPT): Urban Quality as a Factor
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Abstract

Works for urban renewal and building maintenance are increasing the percentage shared in the broad construction sector in European economy.

Interventions are designed by architects, engineers and applied economists using CAD, spreadsheet, DB and regression tools.

These database are disparate and fragmented. They can be tied together and integrated with the powerful ArcGIS framework that can be the basic element for a Decision Support System (DSS) giving more coordinated cost-benefit indicators to entrepreneurs, city managers, analysts, designers, engineers and general public.

The paper describes the construction of a DSS prototype, discusses the general design of a dedicated ArcGIS (integrating CAD, spreadsheets, DB, regression models) for urban enhancement\upgrade design\evaluation, and focuses on the urban renewal cost forecast.

A Case Study is developed using ArcView 8.1, MS Access, MS Excel, Autodesk AutoCAD, applied to accurate design and cost forecast regarding an urban renewal intervention.

Key Words

Cost Appraisal, Cost Benefit Analysis, Urban Renewal Economic Evaluation, Geographic Information System, Economics of Project Evaluation; 3D CAD, Cost Data Base, Economic Geomatics

1. Forewords. Introduction

Research of PAU Geomatics and GIS Group, at *Mediterranean* University of Reggio Calabria (Italy), deals with two converging issues, strategic the first, operational the second.

First. Caring about atmospheric and cultural environment led a growing number of countries, regions, counties and cities to make a difference in the strategy of economic capital built-up. They shift from infrastructure new construction and neighbourhood spread-out to reuse\rehabilitation of existing facilities and to urban conservation\renewal. The Structures of costs and benefits of this more ecological and alternative strategy are paramount complex. In fact they include intangible aspect: smaller quantity of used\compromised natural soil, geological resources and cultural heritage; greater quantity of open land safeguarded; reduced entity of pollution produced; reduced amount of overall transportation efforts. These aspects do not show up in the short term, are not easily evident even if real and consistent and are difficult to be grasped from the general public.

Second. In this new, alternative and more ecological scenario it is much harder, with respect to new construction investments, to get information and to perform estimate. This is on both overall benefits side (understanding \ identification; valuation \ appraisal) and on overall cost side (understanding \ identification; valuation \ appraisal).

Consequently, in regional and urban management the strategy of city renewal and open land preservation\saving (alternative to the strategy of urban spreading-out and infrastructure expansion) is very complex to be chosen\conceived, defined, set-up, detailed and, also, is very demanding in terms of data, information, valuation, appraisal.

2. Regional=Territorial Management. Economic Power of Territory (EPT)

The management of territory and of localized activities faces a growing level of complexity giving the dynamism of local economies.

Private and public activities generate the growth of industry and infrastructure capital. The latter fosters competitive level of local economy and "economic power of the territory", *i.e.* EPT. Investments launch competitiveness but may deprive natural areas and open land, thus generate significant negative impacts on environment, settlement structure and urban resources. These impacts must be managed, controlled and mitigated, starting from the action of measurement, evaluation, estimation, appraisal.

Territorial management can be defined as strategic when impacts are monitored and evaluated: in every stage; in spatial and quantitative terms; on cost and benefits side; on tangible and intangible kind of effects; on environment and economic types of consequences.

Such monitoring, measurement and evaluation of environment and economic impacts takes a great deal of advantages from the availability and use of information systems.

3. Economic Power of Territory (EPT): Urban Quality as a Factor

High quality and liveable urban structure might foster productive activities and might have a positive spillover on social climate than on increase of technological innovation and higher competitiveness of local economy.

People are discovering the inspiring role of classic urban structure such as Liberty (*i. e.*, *Art Nouveau*, *Sezession*, *Jugendstil*, Tiffany) expansion, Victorian neighbourhood, Enlightenment new plantation, inner city *i.e.* urban centres *i.e.* historic centres.

On this basis, interesting experiences are going on in many Western cities and towns. They re-discover classical urban qualities, try to enhance these features, and to amplify the benefits that it is possible to get from them. In the last decade, in these Western cities started public-private strategic interventions in the framework of Urban Complex Programs (called PUC) which have the aim to upgrade the existing urban level of neighbourhoods.

Expression and epiphany of urban dynamics might be the social preferences of inhabitants manifested, as a proxy, by real estate values of shelters *i.e.* market value of architecture *i.e.* prices of the buildings (Ridker, Henning, 1967; Rosen, 1974; Triplett, 1986).

The big ghost and absent in this recent process, that interests many Western cities, is the systematic geographic, spatial and economic information to support the public-private decisions for the urban management and planning

4. Building Prices Related to Actual, Potential or Blighted Urban Quality

One relevant aim of future Urban Information System (UIS) is to detect and recognize the urban values of the settlement, related to parallel market price of buildings. These may be in three different conditions.

First. Relevant urban values may exist in some areas, and may be recognized by inhabitants and expressed by proxies such as coherent building prices *i.e.* real estate values. These areas are called "Areas with Aptitude for Urban Life Quality" or Aptitudinal Areas.

Second. Urban values may exist objectively but contingent factors worsening the market, than real estate prices are not coherent with objective physical features and architectural-aesthetics characteristics. It may be an area\zone effect on real estate market, produced by "negative" racial and social dynamics or weak perception, about real estate potentialities, of inhabitants and potential buyers.

Third. Urban values may exist, but they are particularly deteriorated and suffocated by inefficiency, slum factors and un-coordination in urban management.

In the first case we shall let alone the market to work, because monetary values are coherent with objective, architectural, aesthetic, physical values of settlement.

In the second case contingent and light interventions may be useful and effective in fostering the coherence between potential physical value of urban areas or architectural units and real estate values.

The third case is the most serious and it is a signal of a sub-optimal Pareto condition that may call for structural private-public coordination and heavy interventions. In fact, when there is not coherence between architectural-physical values and real estate prices this can be seen as a signal and an evidence of

sub-optimal Pareto condition,

where it is most probable the progressive deterioration of the qualitative characteristics. It is intuitive that in case of this incoherence, the in depth knowledge and system information become important. Where the market doesn't recognise the intrinsic values, coordinated and significant interventions are needed.

5. Measurement of Urban Quality

At that point we need theory and tools to measure, even roughly, three fundamental elements such as intrinsic values, commercial price and costs for upgrading of areas, zones and neighbourhood parts.

One goal of a systematic information serving the cost-benefit framework (CBA) is to understand and measure (in some way) social, architectural, historic and aesthetic characteristics of urban resources, as articulated in settlement structure (streets; squares; urban blocks; public spaces) and in the bundle of related existing buildings (public; for infrastructure; industrial; commercial; residence).

The steps of such complex quality measurement might be the followings.

First. Boundaries of homogeneous areas, zones and neighbourhood parts are approximated using as indicators morphological boundaries and infrastructural lines. Then, characteristics of each area are valued in the framework of Multi Dimensional Scaling (MDS), using an Index Form of qualitative measurement based upon attitudes and characteristics. Scores assigned to each area for each characteristic=criteria considered, in the respective Index, are processed by MDS algorithm. The ordinal calculation produces a rank order, with respect to global urban quality of the city, of all areas, zones, neighbourhood parts, that can be called "Aptitudinal Areas". Additionally, Aptitudinal Areas can be grouped in broader homogeneous classes, with respect to characteristics of similarity, using the algorithm of specific\dedicated Neural Network approach.

Second. The sub-sequent fundamental step is to perceive if the social preferences (of buyers and inhabitants) recognize and make concrete\actual the quality or potentialities of the Aptitudinal Areas. These social preferences are measured with the proxy of the real estate prices articulated in Urban Zones *i.e.* Homogeneous Price Areas. In case of coherent recognition of the potentialities by the market, the Aptitudinal Areas coincide and agree with the Urban Zones *i.e.* Homogeneous Price Areas.

Third. Urban sub-optimal Pareto condition occurs when an area has high positional, insedative, spatial, architectural characteristics deeply deteriorated. The potentialities of the urban patrimony are not recognized and regress towards worse and worse quality levels and perception. People must be resigned and accept these situations unless that private-public coordinated actions are organized.

Fourth. Once that it has been singled out the areas (or Urban Zones, or neighbourhood parts) where the condition is sub-optimal Pareto and intervention is urgent, a general cost-benefit approach (CBA) must be set. The useful basis for CBA is a reliable geographic information system that then should be based on high quality and detailed urban knowledge. Going further, as in the following parts, a special attention will be given to the definition of the interventions for upgrading urban quality and for assessment of the related costs. The three-dimensional information is a qualifying element of documentation, analysis, estimation, decision.

6. Comparison Between Areas and Zones. Magnitude of Intervention

The spatial-economic comparison between Aptitudinal Areas (with an homogeneous level or rank of quality) and Urban Zones or Homogeneous Prices Areas or micro-zones (with homogeneous values and real estate prices) provides a possible platform for the decisions concerning the areas of intervention for renewal and up-grading.

When the comparison, aided by powerful Data Base and spatial information, detects sub-optimal Pareto condition, the degree and magnitude of differentiation between intrinsic values *versus* commercial prices can help to understand if there is just a short-term problem or, instead, a structural blight and a strong lack of efficiency. Consequently, it is possible to foresee and quantify intervention alternatively in light amount or in structural and heavy terms.

It is crucial to link the intervention typologies with tools to evaluate them in monetary terms. A spatial information system is of paramount importance to evaluate costs for urban up-grading and the probabilistic positive impact of repair, up-grading, re-furbishment, site amelioration, on real estate value.

7. Valuation of Urban Renewal Costs and Impacts

As stated before, renewal management at neighbourhood and building levels, can be defined strategic when all phases of intervention such as visioning, conception, planning, design and implementation are accompanied by evaluation: economic-quantitative of activities; predictive of future probabilistic impacts.

Following parts of the present PAU research are focused on the first and crude economic factor of complex urban renewal strategies: costs of intervention.

Cost quantification and forecast have to be applied systematically, and not occasionally, to activities and investments. In this way both information system and integrated evaluation tools aid strategic management and program implementation.

8. Focus on Cost Estimate of Urban Renewal and Architectural Up-Grade

Concluding, focus of present research are the activities of urban renewal and quantitative assessment of relative costs by the mean of appropriate tools coordinated by the GIS framework *i.e.* "preventive evaluation of the urban renewal and architectural up-grade and restoration costs". The accomplishment of this aim cannot be taken for granted because, especially in Italy, there is an endemic absence of systematic data on the sector costs. This, despite the relevant weight that the activities of renewal and restoration have in this country, specially for buildings with historic, artistic and insediative characteristics.

The research here presented tries to overcome this informative lack by starting the build-up of a Data Base containing a relevant collection of information concerning detailed costs of interventions. Costs are estimated by microeconomic analyses of the elemental technical factors of production for building restoration, physical conservation, maintenance. The Data Base, founded on analytic knowledge, aggregated elemental inputs in modular operations and works.

The input combinations is based upon the information deriving from the monitoring of: real world interventions; real world building yards; contract implementations.

The final aim is to synthesize technical data and related monetary assessment and quantifications, in order to forecast and monitor the costs. Consequently, the spatial informative structure is systematically linked with Data Base. Geometric data are related to the microeconomic analyses of the elemental input works and of the relative production factors. Thanks to this information it is possible to assess the interventions first in quantitative than in monetary terms.

In order to verify the approach, an operative methodology has been set and then experimented by Case Study involving many worker units in monitoring and in research activity. At the first step, to have an efficient management, data collection have been decentralized and performed by different operators endowed with different Data Base run by accessible and inexpensive MSAccess® tools.

In a subsequent step, desk work structures and unifies all information in GIS geodatabase. The object oriented programming allows to link GIS to other useful engines as Multi Criteria Analysis for the choice among many alternatives.

In fact, the choice of the interventions can be supported by the Data Base. It is related to costs of finished works and to important ecological characteristics of the materials: energetic advantages; best resistance to the atmospheric agents; environmental compatibility. It makes it possible to choose the most ecological and best possible scenarios of renewal.

9. Case Study

The set-up of the system here presented is in progress and a the general methodology is being experimented within a Case Study by the PAU University Department, at Mediterranean University of Reggio Calabria.

The study area is the inner-city or historic centre of Reggio Calabria, the Southeast city of continental Italy inhabited by 2000.000 people.

Aim of the Case Study is the build-up an Urban Information System (UIS), *i.e.* an Urban GIS, that integrates the important economic data with detailed 3D spatial information.

The integrated economic data concern cost estimate, potential benefit forecast, three-dimensional visualization of the properties to detect future beneficiaries of interventions, real estate market data. The research configures an Economic Geomatics as an integrated cognitive support to government action for amelioration of city quality and urban life.

Visualization of the urban reality of Reggio Calabria on the official topographic map and aerial orthophoto is geo-referenced. The boundaries of the cadastral maps and related cadastral sections are

singled out. Their boundaries are indicatively drew on topographical map and on aerial orthophoto. This is in order to accurately visualize the cadastral entities ("Fogli", or Homogeneous Prices) in the different geodetic, projective and cartographic ambits.

In fact, the ambits ("Fogli") included in the cadastral maps contain homogeneous real estate values in a past age around 1930, which should be systematically verified and validated through today up-dated observations of confidential market data.

These data are then georeferenced in GIS. In the latter, all such information can be available integrating different sources: physical descriptions expressed in CAD extensions; cadastre alphanumeric registrations expressed in DBMS extensions; aerial orthophotos and other aerial original documents expressed in Image extensions both at architectural and urban levels.

Recalling the basic methodology, the overlapping, thanks to GIS, between Aptitudinal Areas and Urban Zones allows to single out the ambits of potential and/or actual blight and deterioration where priority should be given for interventions.

Among these areas there is the Latin District, so named because is populated by university students of Architecture, Engineering, Forestry and Law Schools, and in analogy to the *Quartier Latin* in Paris. It is a Liberty (*Art Nouveau*) district situated in the North part of the historic centre of Reggio Calabria, between the port and the University. The detailed analyses make it possible to single out the high morphological-insediative and architectural qualities of Liberty urban blocks. The living units, in Liberty buildings, have been surveyed and drew in plan, elevation and section. Then they have been investigated to diagnose material deteriorations as well as structural mechanisms of collapse\breakdown.

The GIS tools link different manual data the constructive element with the in progress deterioration. There is therefore another link to the Data Base of interventions and the possible works to realize it. The data on the costs allow to calculate the monetary amount of interventions on each structural and typological deteriorated element. At the end there will be available both the list of the necessary works for the conservation of the living unit, as well as the total monetary cost of interventions calculated in real time.

Concluding, this methodology makes it possible to know very accurately the boundaries of the property, the degree of conservation and maintenance of these buildings, and also the integrity of the original characteristics. This is in order to evaluate the types and costs of future interventions of maintenance and up-grading of every living unit, building, block, area.

10. Future Research

Future research will investigate the probabilistic benefits of a great strategy for physical conservation and social revitalization of Latin District, where are located the extraordinary masterpieces of art called Riace Bronzes (fifth century before Christ, probably from Fidia epigones) and there is the world largest collection of Magna Graecia archaeological findings and relicts as well as of sub-marine discoverings in the National Museum.

The strategy outlines a global renewal of the blighted port area, the construction of a new branch of the National Museum directly connected to cruise ship pier, railroad station and highway exits, to attract a large number of visitors.

Latin District and its fascinating Liberty architecture will be revitalized also to warmly host visitors with home hotel, *i. e.* bed and breakfast, organization. At that time architectural up-grade will be implemented and completed for an economic new deal. And GIS will have served again our local world.

11. Conclusions

The overall georeferenced analysis of an urban centre under the different aspects of intrinsic and potential insediative quality and of real estate prices, is a usefully support for urban strategy and management. It allows Urban Economics to single out (with good reasons) areas of blighting and potential deterioration. The latter deserves priority of intervention. When the potential values are significant, those areas have a higher aptitude to react with success to the interventions and to renewal programs.

In the Case Study, the research starts to integrate geographic information and 3D visualization with knowledge of costs and potential benefits of the interventions. Also the interaction with the Cadastre, the list of properties and of proprietors (owners) visualized in the third-dimension allow to know the stakeholders of the program and people to be involved. All this powerful system helps to easily evaluate qualitative state of reality, need of interventions, magnitude of costs and probabilistic benefits, dimension and maze of the resources to be mobilized, subjects to be involved in the revitalization strategy.

References

- De Mare G., Morano P. (1997) I Sassi di Matera, modelli per la valutazione rapida dei costi preventivi di recupero. *Pagine di Estimo. Quaderni del Dipartimento Patrimonio Architettonico Urbanistico*. Università degli Studi di Reggio Calabria, n. 13-14: pp. 1-28
- Ferry D. J., Brandon P. S. (1994; 6th) *Cost Plannings of Buildings*. Blackwell Scientific Publication Ltd. BSP Professional Books. Oxford, Uk
- Giordano G. (1998) Sistema Informativo Territoriale e processo di valutazione per la gestione e manutenzione del patrimonio edilizio. *Genio Rurale*. n. 10: pp. 15-31
- Manganelli B. (2001) Impiego dell'intelligenza artificiale (reti neurali) nella delimitazione di zone omogenee per caratteri del mercato immobiliare. In: *Genio Rurale*, n. 5: pp. 3-12
- Massimo D. E., Mollica E. (2004) Fiscalità immobiliare come leva per la riqualificazione. Integrazione tra GIS e Neural Networks Models. Paper presentato per la 6a Conferenza MondoGIS, *Geoesplora Workshop 2004*. Roma, 21-22.05.2004
- Massimo D. E., Mollica E. (2003a) Valutazione del rischio, contabilità dei centri storici, strumenti GIS. *MondoGis*. Luglio-agosto. Roma, Edizioni MondoGIS: pp. 26-30
- Massimo D. E., Mollica E. (2003b) GIS Insediativo per la protezione civile. Paper presentato per la: 6a Conferenza Nazionale Utenti GIS.ESRI, *GIS e società*. Roma, 09-10.04.2003. Roma, ESRI.Italia, CD-Rom
- Massimo D. E., Mollica E. (2003c) Environmental and Cultural Resources. Total Inventory and Valuation Using Arc View. Proceedings of the 23th ESRI International User Conference 2003. *GIS serving our world*. San Diego, California, Usa, 07-11.07.2003. ESRI Press, Redlands, California, Usa, CD-Rom
- Mattia S. (1995) *La valutazione preventiva dei costi i costruzione*. Città Studi Edizioni, Milano

- Mollica E., Manganelli B., Massimo D.E. (2002) GIS, zone urbane, Neural Networks. Poster su invito presentato a: 5a Conferenza Nazionale Utenti GIS.ESRI, *E-geography: tradizione e innovazione*. Roma, 10-11.04.2002. Roma, ESRI.Italia,CD-Rom
- Mollica E., Massimo D. E. (2000) Valori immobiliari, finanza locale, perequazione fiscale. Preliminari esiti di valutazioni immobiliari. In: XII Riunione Scientifica (2000) della Società Italiana di Economia Pubblica, *Politica fiscale, flessibilità dei mercati e crescita*. Pavia, 06-07.10.2000. Università degli Studi di Pavia, Dipartimento di Economia Pubblica, CD-Rom
- Mollica E., Massimo D. E. (2002) Analisi dei mercati immobiliari della Calabria. Applicazioni di *parsimonious models* a Reggio Calabria e Lamezia Terme. In: Roscelli R. (ed) *Mercato immobiliare, innovazione e gestione dei catasti urbani*. Quaderno CeSET n. 8, volume II: pp. 472-529
- Mollica E., Massimo D. E. (2003a) GIS e valutazione dei costi negli interventi di riqualificazione urbana. In: *Urbanistica Dossier* n. 58 "Sistemi informativi territoriali: dalle banche dati a strumento di governo del territorio". Roma, Inedizioni, CD-Rom
- Mollica E., Massimo D.E. (2003b) Valutazione degli investimenti sul territorio e strumenti GIS. In: Stanghellini S. (ed) *Valutazione degli investimenti sul territorio*. Atti del XXXII Incontro di Studio del Centro Studi di Estimo ed Economia Territoriale, CeSET. Venezia, 11.10.2002. Centro Stampa 2P Editrice, Firenze
- Mollica E., Massimo D. E. (2003c) GIS Totale e valutazione di interventi territoriali. Poster presentato per la: 6a Conferenza Nazionale Utenti GIS.ESRI, *GIS e società*. Roma, 09-10.04.2003. Poster CD-Rom
- Mollica E., Massimo D. E., Barbalace A., Vescio M. (2003) GIS Totale e valutazione di interventi territoriali. Poster presentato per la: 6a Conferenza Nazionale Utenti GIS.ESRI, *GIS e società*. Roma, 09-10.04.2003. Poster CD-Rom
- Morano N., Manganelli B. (2001) Comparative performance of structural equations system and neural networks for real estate appraisal. Proceeding of the 7th SIGEF Congress, *New Logics For the New Economy*. Edizioni Scientifiche Italiane, Roma
- Mollica E., Musolino M. (1998) Metodi e strumenti di valutazione applicati alla conservazione culturale e ambientale. *Pagine di Estimo. Quaderni del Dipartimento Patrimonio Architettonico Urbanistico*. Università degli Studi di Reggio Calabria, n. 16-18: pp. 1-36
- Musolino M. (1994) Principi di stima dei costi negli interventi di recupero. *Quaderni del Dipartimento Patrimonio Architettonico Urbanistico*. Università degli Studi di Reggio Calabria, n. 8.
- Orefice M. (1994) Le economie di scala applicate al recupero del Centro Antico di Napoli. *Genio Rurale*, n. 10
- Pasini A. (1992) *Analisi dei costi*. Il Sole 24 Ore, Milano
- Patrone P. D. (1990) *Sulla stima dei costi del recupero edilizio*. Edizioni Culturali Internazionali Genova, Genova
- Realfonzo A. (1995) Riqualificazione ambientale come motore dello sviluppo. Il problema delle valutazioni. *Genio Rurale*, n.12
- Ridker R. G., Henning J. A. (1967) The Determinants of Residential Property Values with Special References to Air Pollution. *Review of Economics and Statistics*, 49 (May): pp. 246-256
- Roscelli R. (2002) (eds) *Mercato immobiliare, innovazione e gestione dei catasti urbani*. CeSET, Firenze, 2 Volumi
- Rosen S. (1974) Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. *Journal of Political Economy*, vol. 32, 825, January: pp. 34-55
- Rothenberg J. (1965) Urban Renewal Program. In: Dorfman R. (ed) *Measuring Benefits of Government Investment*. The Brookings Institution, Washington, DC, Usa: pp. 292-366
- Rothenberg J. (1967) *Economics Evaluation of Urban Renewal*. The Brookings Institution, Washington, DC, Usa
- Simonotti M. (1997) *La stima immobiliare*. Utet, Torino
- Stanghellini S. (1990) *I costi di riurbanizzazione*. Franco Angeli, Milano
- Triplett J. E. (1986) The Economic Interpretation of Hedonic Methods. *Survey of Current Business*, January: pp. 36-40

Figures

Figure 01. Italy (ArcView)

Figure 02. Italy. Calabria region. Reggio Calabria province (Sistan administrative map)

Figure 03. Calabria region. Reggio Calabria province. Municipality boundaries (Census Data Base and Sistan administrative map)

Figure 04. The Messina Strait and Reggio Calabria area. Scale 1:250 000. Chorographic military map (IGMI)

Figure 05. The Messina Strait and Reggio Calabria area. Scale 1:100 000. Topographical military map (IGMI)

Figure 06. The area of Reggio Calabria. Overlapping of topographical military map (IGMI) and technical vector map (Municipality). Scale 1:25 000

Figure 07. The area of Reggio Calabria. Case Study. Overlapping of topographical military map (IGMI) and technical vector map (Municipality). Zoom. Scale 1:5 000

Figure 08. Case Study. The Latin District. Cadastral Parcel 216. Overlapping of aerial-ortho-photo-image, cadastral map (Cadastre Administration) and technical vector map (Municipality). Zoom. Scale 1:2 000

Figure 09. Case Study. The Latin District. Cadastral Parcel 216. Overlapping of aerial-ortho-photo-image and architectural ground floor plan drawing (based on the work of: Praticò M., Pulvirenti R., Scarfò A, Scarfò C.). Scale 1:1 000.

Figure 10. Case Study. The Latin District. Cadastral Parcel 216. Elevation drawing (based on the work of: Praticò M., Pulvirenti R., Scarfò A, Scarfò C.). Scale 1:200

Figure 11. Case Study. The Latin Quarter. Cadastral Parcel 216. Elevation drawing (based on the work of: Praticò M., Pulvirenti R., Scarfò A, Scarfò C.). Physical deteriorations. Scale 1:200

Figure 12. Case Study. The Latin Quarter. Cadastral Parcel 216. Elevation drawing. Physical deteriorations, work of restoration (based on the work of: Praticò M., Pulvirenti R., Scarfò A, Scarfò C.). Total cost of intervention. Linked to cost Data Base. Zoom. Scale 1:100

Figures

Figure 01. Italy (ArcView)

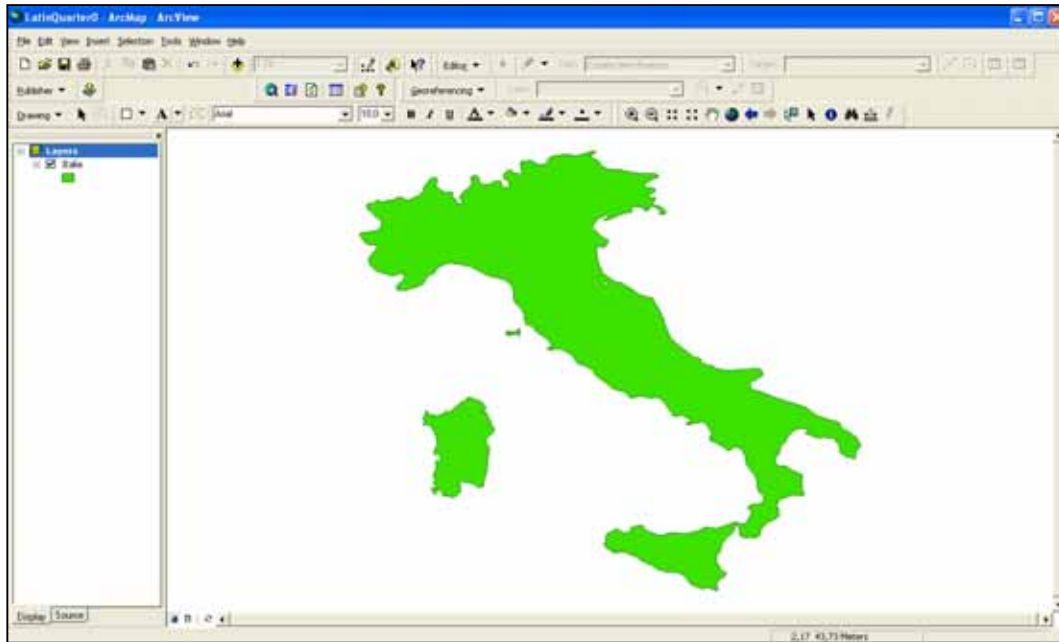


Figure 02. Italy. Calabria region. Reggio Calabria province (Sistan amministrative map)

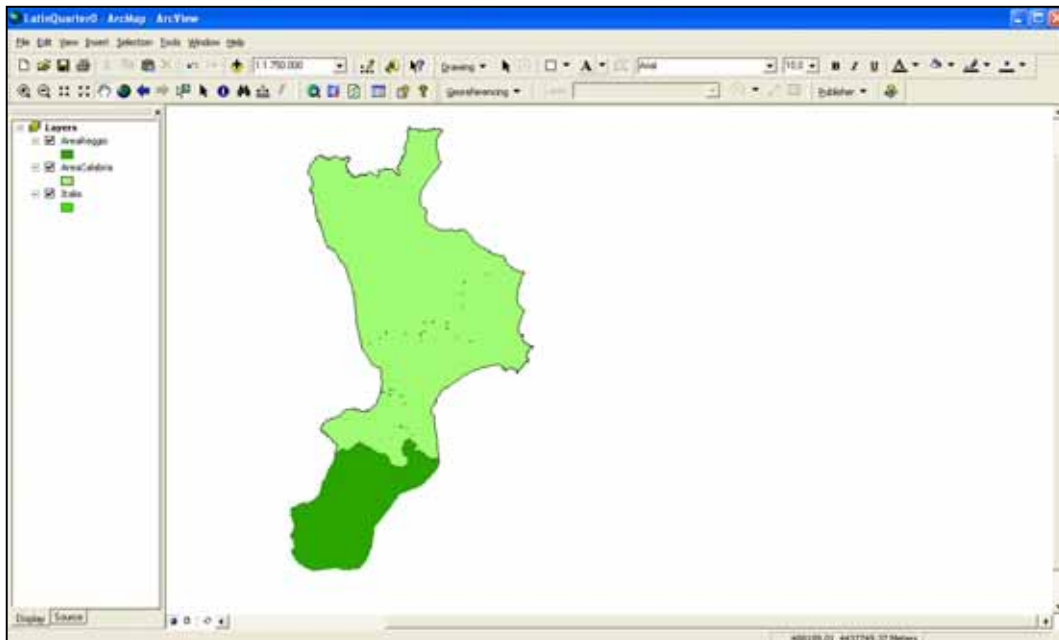


Figure 03. Calabria region. Reggio Calabria province. Municipality boundaries (Census Data Base and Sistan administrative map)

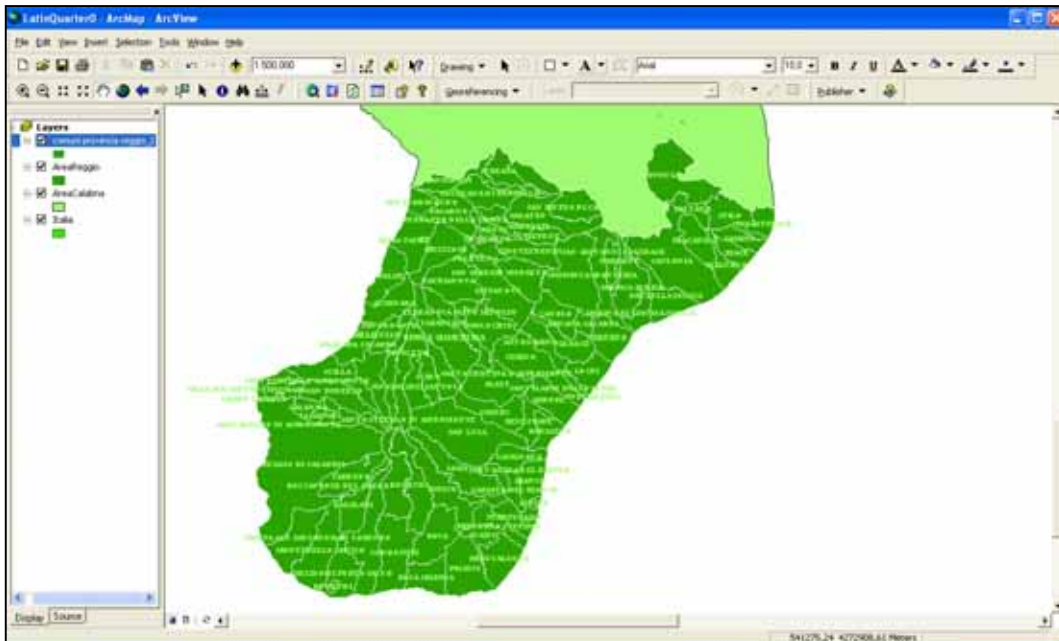


Figure 04. The Messina Strait and Reggio Calabria area. Scale 1:250 000. Chorographic military map (IGMI)

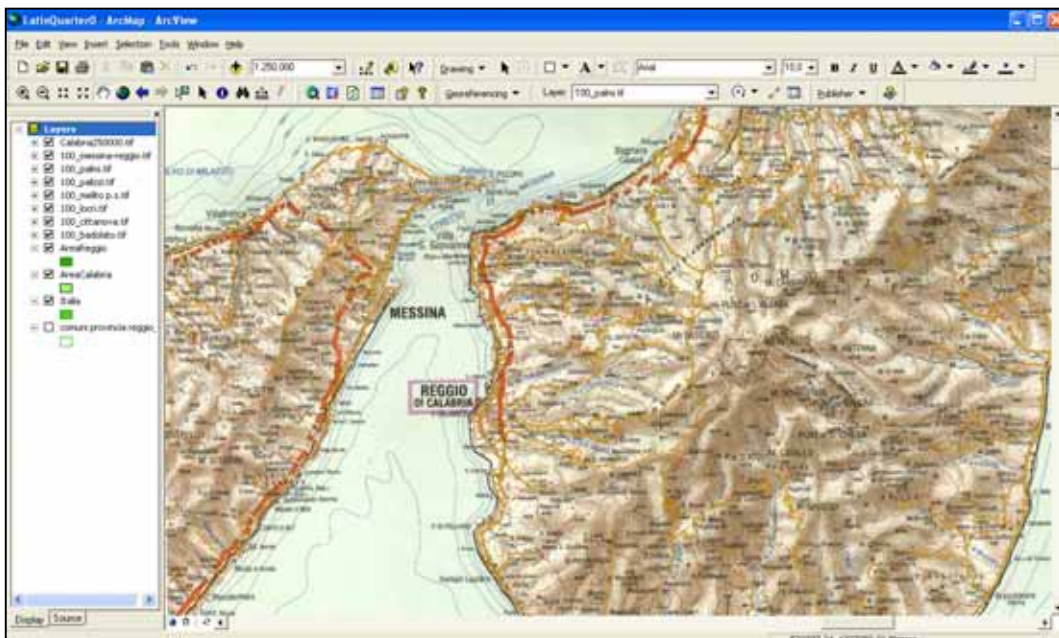


Figure 05. The Messina Strait and Reggio Calabria area. Scale 1:100 000. Topographical military map (IGMI)

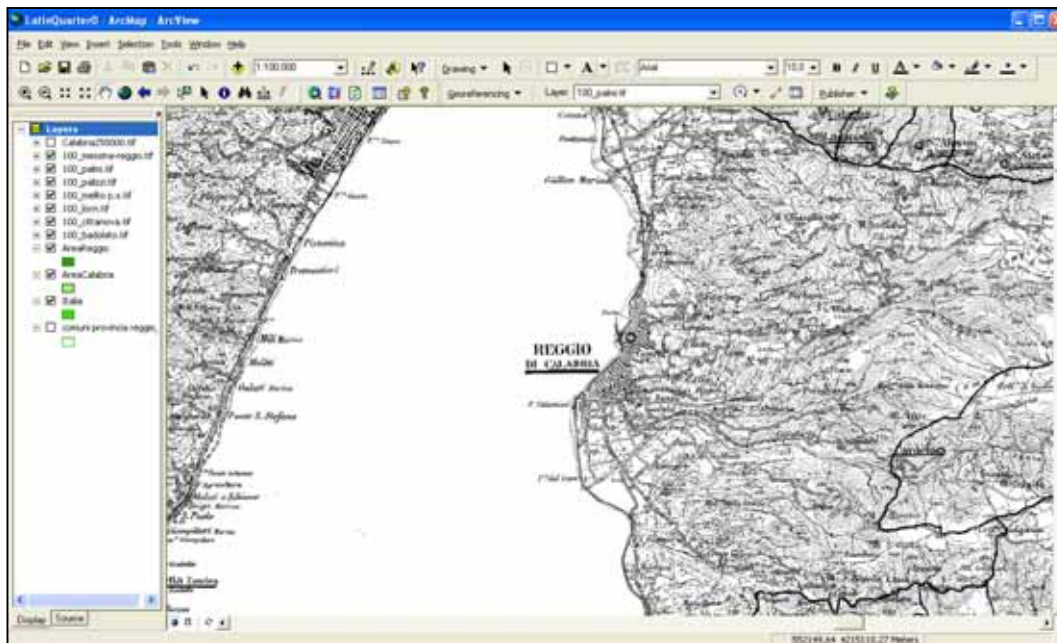


Figure 06. The area of Reggio Calabria. Overlapping of topographical military map (IGMI) and technical vector map (Municipality). Scale 1:25 000

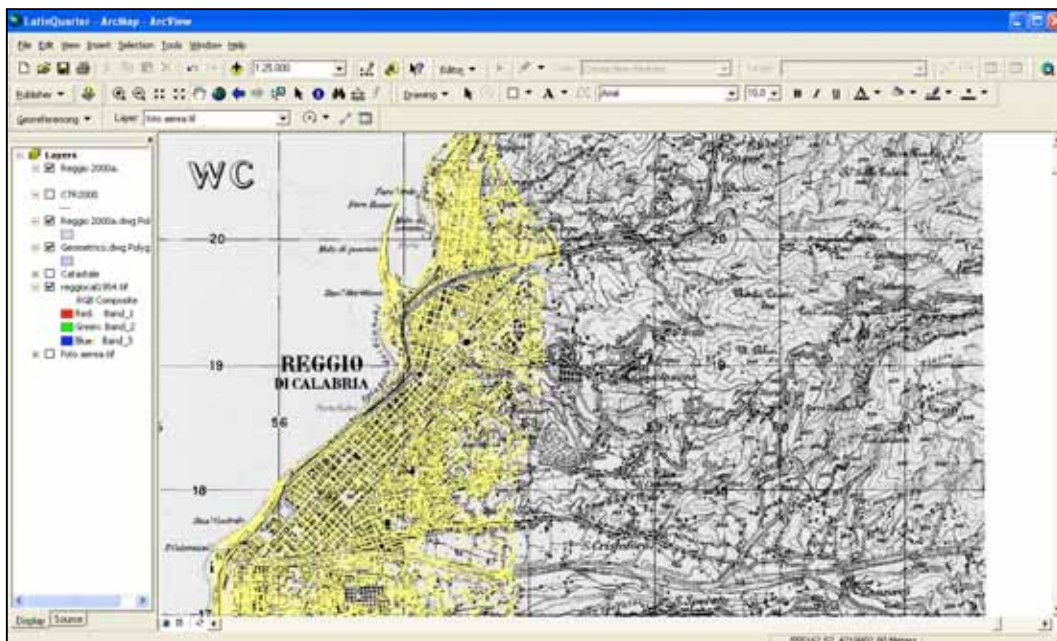


Figure 07. The area of Reggio Calabria. Case Study. Overlapping of topographical military map (IGMI) and technical vector map (Municipality). Zoom. Scale 1:5 000

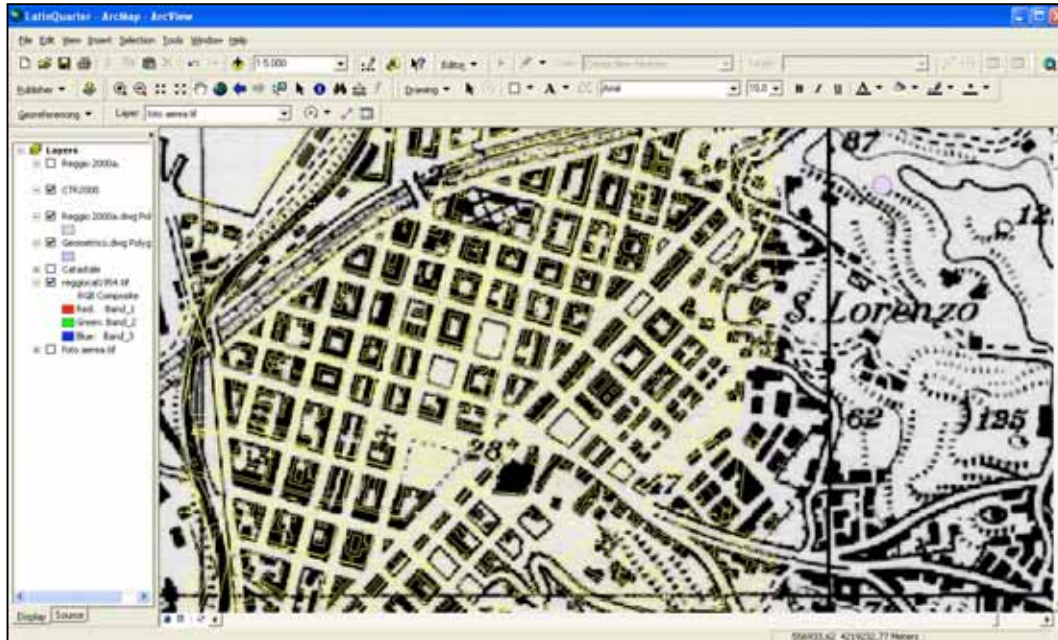


Figure 08. Case Study. The Latin District. Cadastral Parcel 216. Overlapping of aerial-ortho-photo-image, cadastral map (Cadastr Administration) and technical vector map (Municipality). Zoom. Scale 1:2 000

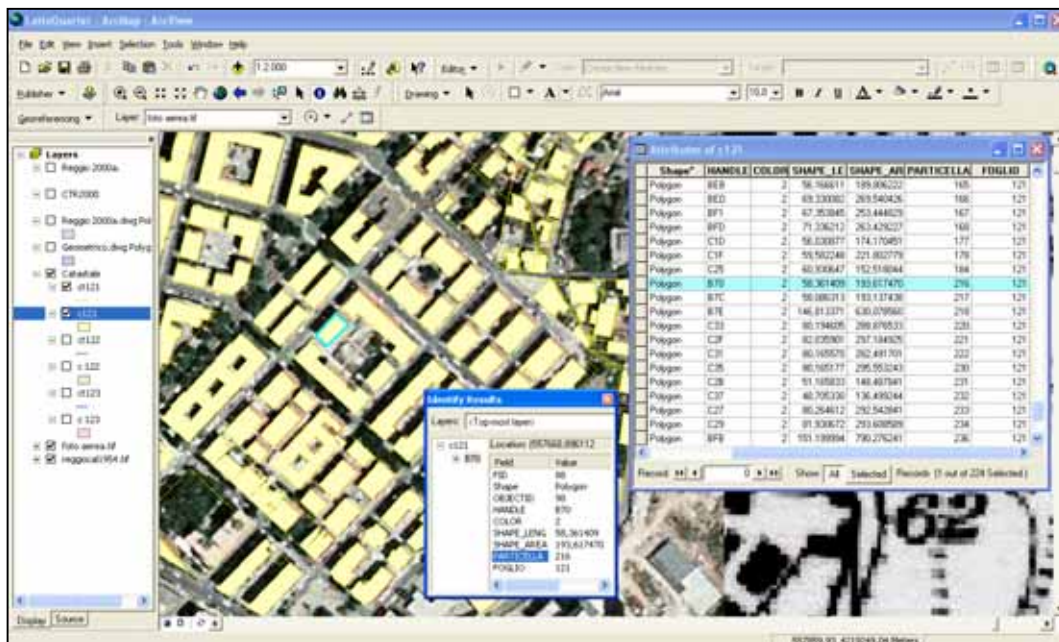


Figure 09. Case Study. The Latin District. Cadastral Parcel 216. Overlapping of aerial-ortho-photo-image and architectural ground floor plan drawing (based on the work of: Praticò M., Pulvirenti R., Scarfò A, Scarfò C.). Scale 1:1 000

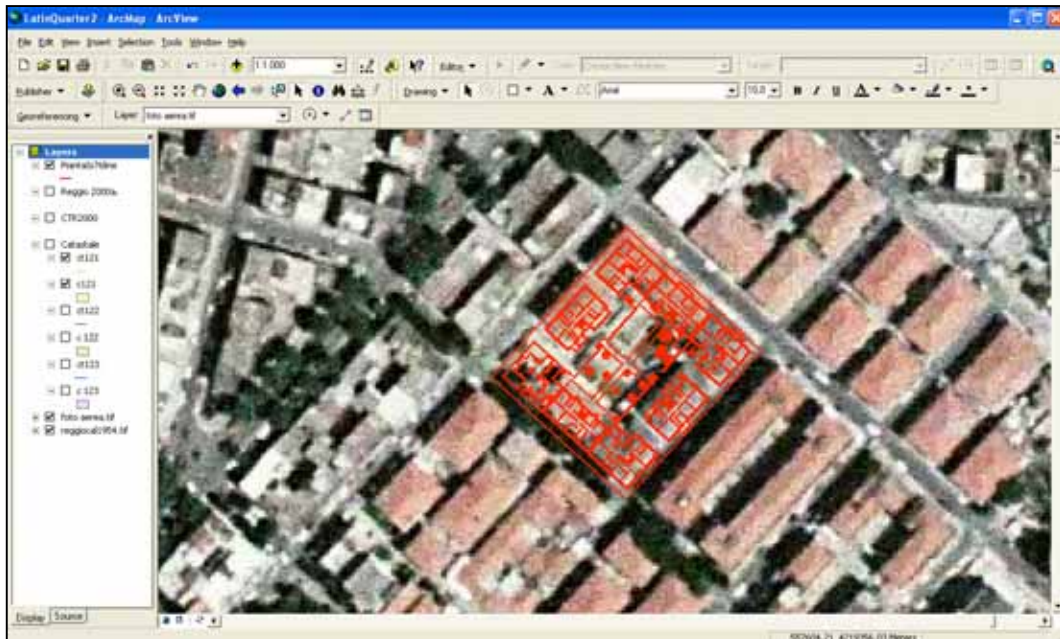


Figure 10. Case Study. The Latin District. Cadastral Parcel 216. Elevation drawing (based on the work of: Praticò M., Pulvirenti R., Scarfò A, Scarfò C.). Scale 1:200

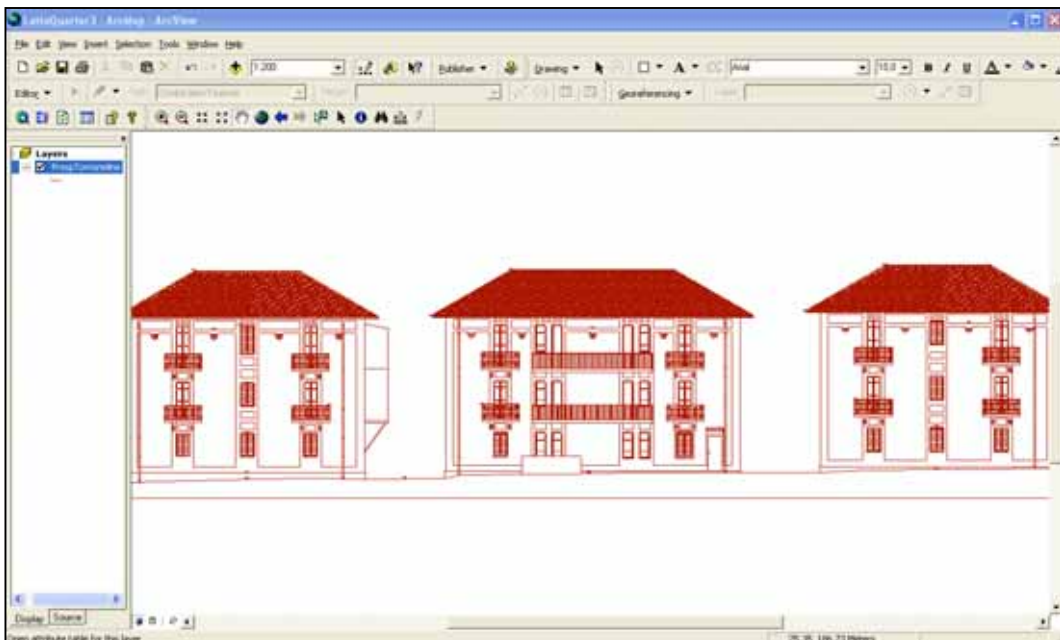


Figure 11. Case Study. The Latin Quarter. Cadastral Parcel 216. Elevation drawing (based on the work of: Praticò M., Pulvirenti R., Scarfò A, Scarfò C.). Physical deteriorations. Scale 1:200

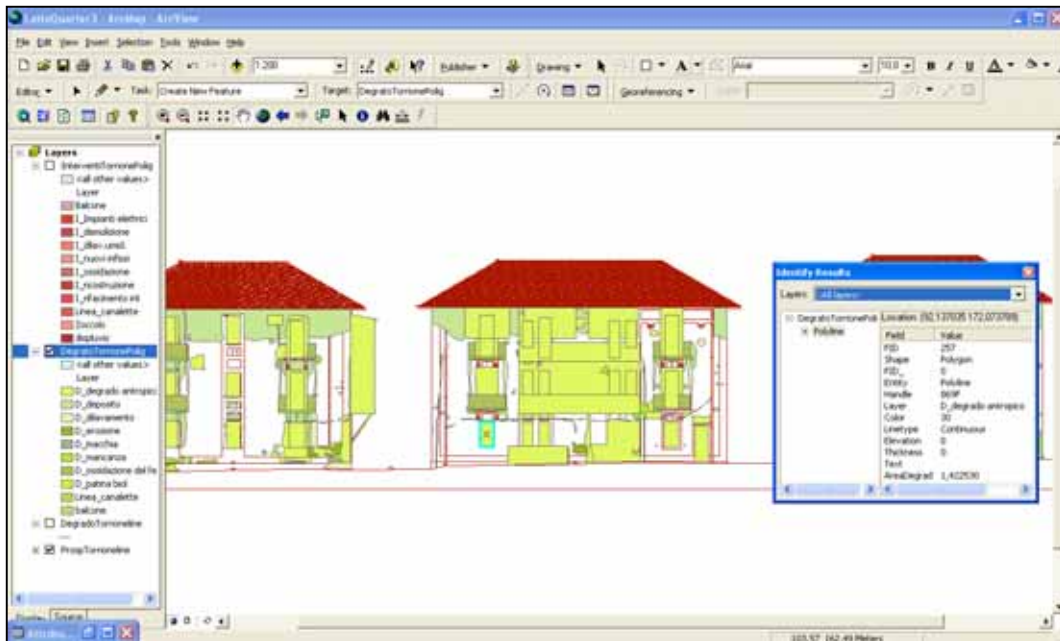
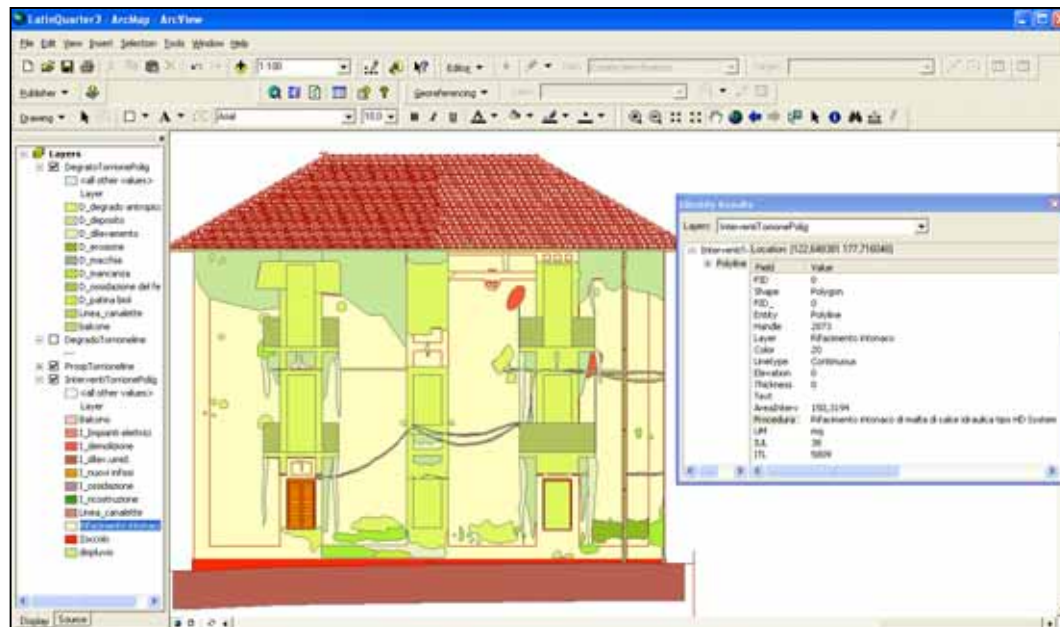


Figure 12. Case Study. The Latin Quarter. Cadastral Parcel 216. Elevation drawing. Physical deteriorations, work of restoration (based on the work of: Praticò M., Pulvirenti R., Scarfò A, Scarfò C.). Total cost of intervention. Linked to cost Data Base. Zoom. Scale 1:100



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