Planning Approach for Emerging Economies in Latin America

Mario Camacho Cardona[1], and David Camacho Alcocer[2]

***Abstract*—**The rapid increase in urban population represents serious challenges for humanity which need to be properly addressed to avoid unsustainable urban growth. In Latin America, a lack of growth management and proper urban regeneration strategies has resulted in undesirable and unsustainable development. Hence, there is an urgent need to development a planning tool that allows the region to achieve a sustainable urban growth and regeneration.

To address urban regeneration, this paper presents a model based on urban observation data, the vocation and suitability of the land as well as the urban form, through the linkage of administrative and governance activities, which include details about the disruption of the urban fabric and deterioration of the urban environmental image. These aspects give rise to three studies, the territory's urban environmental planning, the sociopolitical governance and the linkage and coordination of all parts. The studies, which have been continuously developed at the Acatlán School of "Phenomenological Semantics" by Dr. Mario Camacho Cardona since the 1970s, are based on the premise that the object under study, from an architectural-urban perspective, is the "environment" within a phenomenological trend, where the form in the reality emerges in the mind as an image, through what Dr. Mario Camacho denominates the perceptual "Semic Act."

The model is presented through a case study in Naucalpan, municipality within the Greater Mexico City area, and consists of a proposed urban regeneration project along an existing railway track running parallel to the local river called "Río Hondo." The proposal consists of a 9.6-km corridor that includes the introduction of a light train transit (LRT) on the existing tracks, which seeks to connect to the city's metro system. However, the regeneration project would not only improve the public transportation system, the mobility and accessibility of the area, but would also integrate the city's public spaces through a green corridor conformed by the banks of the river and a series of trails for pedestrians and cyclists. Per se, the project would integrate the fragmented urban form.

***Keywords*—**Urban Regeneration, Sustainable Planning, Multimodal and Sustainable Transportation, Urban Mobility and Accessibility, "Semic Act".

I. Introduction

ACCORDING to the UN, in 2014 54% of the world's population lived in urban areas and it is expected to increase to 66% by 2050. However, although this is well known, the rapid growth in urban population has not been properly dealt with in Latin America. Such is the case of the Greater Mexico City, which grew from merely 3 Mio people in 1953 to more than 20 Mio by the year 2000. As it is evident, this growth caused severe urban expansion and deterioration. Currently, the city experiences severe problems like vehicular congestion, slums, lack of infrastructure, urban fragmentation and environmental degradation. Furthermore, urban sprawl and lack of infrastructure lowers the quality of life of the population, especially in the surrounding municipalities where services, especially public transportation, are deficient.

This is the result of more than 60 years of unplanned and car oriented development, and reflects a lack of governmental capacity, growth strategy and solid planning models to tackle the dynamics of rapid urbanization. Sustainable development should be in focus for the Greater Mexico City governments; however, the basic planning models and tools are still lacking or are copies of models applied elsewhere in the world. These however, might not fit local contexts; requiring specific solutions that depend on the cultural, political, social and environmental reality of a place. Hence, it is necessary to establish a framework to effectively attack the expected urban growth without neglecting local socio-economic aspects and physical characteristics.

To address urban regeneration, this paper presents a model based on urban observation data, the vocation and suitability of the land as well as the urban form, through the coordination of administrative and governance activities, which include details about the disruption of the urban fabric and deterioration of the urban environmental image. These aspects give rise to three studies, the territory's urban environmental planning, the sociopolitical governance and the linkage and coordination of all parts. The studies, which have been continuously developed at the Acatlán School of "Phenomenological Semantics" by Dr. Mario Camacho Cardona since the 1970s, are based on the premise that the object under study, from an architectural-urban perspective, is the "environment" within a phenomenological trend, where the form in the reality emerges in the mind as an image, through what Dr. Mario Camacho denominates the perceptual "Semic Act"[1].

[1]Facultad de Estudios Superiores Acatlán, National Autonomous University of Mexico

[2]Railway and Transportation Engineering Institute, University of Stuttgart

[1] The "Semic act" is developed based on categorized signs. The immediate object of analysis is the "discourse;" meaning the set of all elements of expression used in a "Semic Act," which is the act of expression that suggests a meaning. By meaning it is understood the semantic content of the discourse, which covers all meanings linked to the expression elements used in the "Semic Act"; understanding that "the content" of a discourse varies necessarily between emitter and receiver and between several receivers, since the "meanings linked to an expression" are built individually by each actor (emitter or receiver). *Translation from [10].*

II. Case Study

The planning model is presented through a case study located in the Municipality of Naucalpan; part of the Greater Mexico City area (Fig. 1).

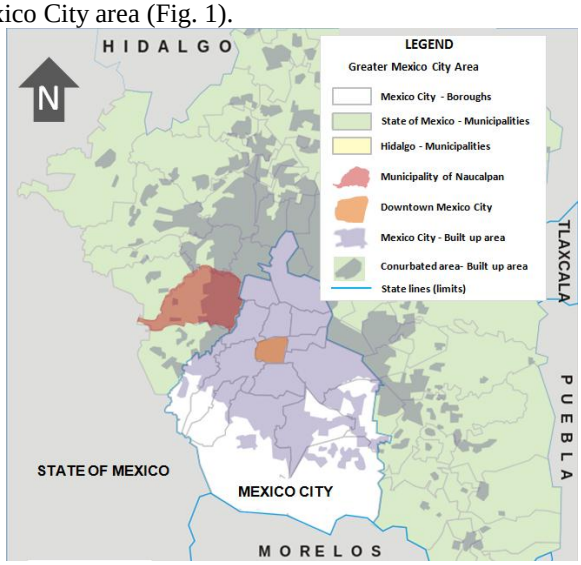

Fig. 1 Municipality of Naucalpan – Located on the north-western limit of Mexico City

Naucalpan, due to its proximity to Mexico City, developed as an industrial area and bedroom community. However, since 1960, the area has undergone important shifts in economic activities; changing functions from industrial to service-commercial and residential around it [1]. The loss of the industrial means of production caused the area to enter a process of urban succession, a fact barely recognized by the municipal authorities; making the area lag behind its developmental potential. This bares not only environmental and social consequences, but also economic through tax revenue loses previously perceived from industrial activities [1]. Exploiting the area's potentials (e.g. privileged inner localization, connectivity, existing services and social and economic demands) for new uses is also sensible from a sustainable point of view. To introduce new uses, land uses need to be modified and high quality services, such as transit and parks, introduced through public investment, which have positive economic impacts. For example, public investment in transit has impacts in land value increases, which result in part by transit-induced capitalization under different urban conditions [2]. To allow municipalities to access revenues derived from land value increase, it is necessary to develop appropriate land value capture instruments (i.e. tax-based or development base), strategies (i.e. market based) and policies (e.g. mixed used or transit supportive), which do not discourage investment or cause local population displacement.

The previous discussion reveals a deficient municipal planning policy, which fails to respond to modern urban dynamics. Therefore, it is necessary to develop a new municipal planning approach that incorporates dynamic responses to the ever changing socioeconomic and environmental processes. This approach should seek to place Naucalpan, taking advantage of its strategic location within the Metropolis, as an important center of sustainable development[2].

The new planning approach identifies derelict urban areas needing improvement in accordance with modern dynamics (Fig. 2). In particular, the case study presented consists of an urban regeneration plan proposed to the Municipality, which seeks to improve its urban fabric and promote changes in land uses while integrating historical aspects and macro urban processes (political, economic and social). It is expected that interventions become catalysts of development that modify the urban space and the vocation of the urban land (e.g. form industrial to commercial); creating new sources of Municipal income and improving the quality of life of local residents.

Fig. 2: Derelict light industrial and existing tracks - opportunity to introduce new means of production and revenue.

The area of intervention proposed displays interesting urban and mobility related characteristics attractive for the regeneration project. The area is traversed by an existing railway corridor running parallel to the local river "Río Hondo." The project proposes the introduction of a mass transit system (i.e. LRT) on a 9.6-km section of the corridor. The LRT system connects to Mexico City's metro system and seeks to encourage development. However, although a high quality transportation system is considered an important aspect for sustainable development; the regeneration project needs to go beyond improving public transportation, mobility and accessibility. It needs to integrate public spaces and activities already present in the area so to create acceptance and positive socioeconomic impacts. This is sought through the implementation of a green corridor made up by the river banks and a series of pedestrians and cyclists trails connecting to plazas where social and economic activities take place (Fig. 3). Per se, the project integrates the fragmented urban form; increasing the attractiveness of the area. However, to maximize the benefits of regeneration, the river needs to be treated to recreational levels.

Six aspects that generate urban decay have been identified and addressed in the planning model proposed [1]: Urban fabric, form and urban environmental image fragmentation; poor public and private transportation mobility and accessibility; poor urban space adaptation to existing social and communal activities; no improvement of urban landscape and pollution of the "Río Hondo" River. These aspects provide the basis of the proposed urban regeneration, which simultaneously seeks to integrate improvements to the social fabric, environment and human health. It is important to realize that the improvement of the contiguity and continuity

[2] e.g. implementing an integrated mixed used business district and a high quality multimodal transport green corridor at the fringes of Mexico City, but within the consolidated metropolitan area

of the urban space is achieved through the elimination or minimization of the urban fragmentation, which is possible by eradicating natural/man-made barriers, incoherent land uses and by providing centralized social infrastructure and services [1]. These actions increase the quality of life and allow a healthier and vibrant environment.

Fig. 3: Existing tracks approaching the river, where plazas and trials can be implemented.

III. General Planning Operation Model

To achieve the planning goals and urban regeneration, it is necessary to modify the municipal urban management and administration process. With this in mind, five specific operation models and monitoring and evaluation phase are proposed:

- Urban observation model
- Geomorphology model
- Urban-regional planning and coordination model
- Model of rural-urban design and construction process[3]
- Governance model
- Monitoring and evaluation

All these constitute the general planning operation model and are briefly described in following subsections.

A. Urban Observation Model

Regarding urban observation actions, there are two operational entities that support planning activities. The entities, known as "workshops," emanate from centers of higher education such as universities or research institutes, where monitoring tools are developed for policy-making [3]. The entities are consultative, vocational and scientific in character and are known as urban observatory and demographic laboratory.

B. Geomorphological Model

Pertinent studies related to land vocation and suitability are developed under this model. The studies integrate the environment (ecosystem) represented by natural and human-built structures and their characteristics relative to the social system within a human ecology framework, which analyses the consequences of human activities as a chain of effects through the ecosystem and human social system [4]. In addition, human activities within a region are analyzed from a sustainability perspective; taking their symbiotic relationship to the natural resources (ecological services) available, such that the protection of the environment is pursued. Natural resources include natural features described by the orography, edaphology, geology and hydrology of the place. Human built structures include hard infrastructure (e.g. utilities.) and soft rural-urban infrastructure (e.g. hospitals). Additionally, the social system includes cultural and economic activities and functions, as well as social, administrative and management aspects. These aspects are analyzed through quantitative and qualitative attributes via human ecology (relationship between social system and ecosystem); using truth tables that aim at finding the most suitable conditions for development within a territory. These studies, which are also consultative, vocational and scientific in character, should remain clear from political ideologies and influences. Furthermore, they should emanate from centers of higher education (e.g. universities); including governmental institutes, but depend financially from the municipality. Such is the case of the Municipal Planning Institute[4] in Leon, Mexico; in operation since 1990.

C. Urban Planning and Coordination Model

This model originates from the interpretation and realization of governmental plans and it is in charge of integrating all parts of the affected urban system. As such, the model acts like a linkage to all parts through the planning process; including among other things, public participation, coordination of services and infrastructure between agencies and development of cost recovery strategies of a project performed utilizing standardized[5] cost benefit feasibility studies. Through this process, municipalities are able to develop tempo-spatial programs and the required infrastructure that support the human urban-regional activities.

The project's development is represented through critical path and costs programs. The critical path depicts the sequence of activities; including information regarding required equipment and human resources, the services impacted, and the environmental risks. The costs program delineates the costs of implementation. In addition, maintenance programs need to be established as part of determination and optimization of the asset's life cycle cost (LCC). For instance, in Germany it has been reported that maintenance for light rail transit (LRT) systems represents up to 65% of the total LCC [5]. Certainly, these percentages vary from country to country, but are nonetheless an important part of the service life and safety of any asset.

To have greater possibilities of success and impact, the model is implemented within the IMPLAN, which as mentioned before is autonomous. This way projects are not taken as political platforms and helps ensure the continuity of projects even when municipal officials leave office. The latter is important since usually heads of the institute remain in office longer than their governmental counterparts. In the case of IMPLAN, the director has been 25 year in charge, while municipal presidents change every two to four years.

D. Model of Rural-Urban Design and Construction Process

The location of services and infrastructure previously determined are set within this model. Based on these decisions,

[3] This processes translates to "planificación" in Spanish and not "planeación"

[4] Instituto de Planeación Municipal - IMPLAN

[5] Standardisierte Bewertung (Standi) is an evaluation scheme to determine cost-benefit ratios of public transport projects in Germany; based on the work of Dr. Gerhard Heimerl (Transportation Engineering Institute in Stuttgart) and Intraplan Consult in Munich.

detailed urban and other technical (e.g. civil engineering) designs processes (i.e. schematic design, design development and construction documents) can start. The civil design and construction process includes rough and fine grading plans; utility plans and paving plans. The urban processes include landscape and urban street furniture plans (e.g. fire hydrants, street lights and benches). Likewise, within this model, construction and maintenance standards and specifications are developed and detailed.

All aforementioned processes and activities can be carried out by the municipality (e.g. planning department, public works, etc.) or subcontracted to consulting firms. The construction itself can be done by the municipality or awarded to a contractor (i.e. Construction Company). In any case, the municipality is on charge of the construction inspection based on the standards and specifications.

E. Governance Model

This model consists of sociopolitical activities that link and balance the public opinion of stakeholders (i.e. community) about institutions (i.e. society). Activities seek to engage stakeholders and convince all parts of the benefits of urban interventions carried out by the elected municipal government. The main objective is to build the trust of citizens in their governmental authorities. As such, the conception, design, construction and maintenance of a project, needs to be transparent regarding the resources used; including who performed the work and how they obtained it. When governmental officials finally get the trust of their citizens, the latter begin to achieve higher levels of identification and identity with respect to projects proposed and implemented [6]. Only this way governance (transparency) is able to generate governability (trust) [1]. An example is the riverside regeneration project (Malecon 2000), in Guayaquil, Ecuador where a popular referendum confirmed the support for the project. Furthermore, in the ballot, people were also asked whether they would donate towards its implementation. This resulted in overwhelming active financial citizen participation; with volunteer contributions reaching $182 Mio applied towards the project [7]. This was only possible because the local government had, through a series of previous projects, been able to create governability [1]. Public participation is important for building the trust in local authorities. Additionally, it is not only good for promoting projects and getting public funding; it is also useful to decrease resistance later on, which results in project delays and hence higher costs (political and economic) [8]. To organize public participation, it is necessary to develop fora (e.g. public hearing, design charrette) in which institutions, stakeholders and designers take part in an organized manner. This strategy gives the opportunity to all stakeholders to defuse typical confrontational attitudes and provides early input into the planning process; allowing them, if the process is transparent, to contribute towards the development of the project [8]. Important is that stakeholders are able to give ideas freely, which are then tested during the design process. If the ideas do not work, the community is informed and given the reasons publicly. This process increases acceptance of final solutions and reduces the possibility of resistance, but most importantly gives citizens a sense of ownership [8].

F. Monitoring and Evaluation

Monitoring and Evaluation are extremely important for projects and programs. Monitoring is the coordinated continuous assessment of the intervention and its environment with regard to the planned objectives, results, activities and means [9] in order to ensure that projects and programs are implemented per scheduled and planned activities. So can planning authorities recognize issues early and correct them. Moreover, following the process of implementation is necessary to ensure a successful completion of the project [9]. Evaluation is a systematic and objective assessment of the design, implementation and outcome of an on-going or completed intervention which aim is to determine the relevance and fulfilment of objectives, developmental efficiency, effectiveness, impact and sustainability [9]. Evaluations are performed at four different phases, ex-ante, intermediate and ex-post. An ex-ante evaluation sets the criteria, indicators and targets for monitoring and are concern with project planning and evaluation planning. The evaluation is based on the current situation and forecast which concentrate in five evaluation criteria: relevance, effectiveness, efficiency, impact and sustainability [10]. A mid evaluation determines the efficiency and relevance of the project [10]. A terminal evaluation is performed to check efficiency, effectiveness, and sustainability [10]. To determine impacts and long term sustainability, it is necessary to perform an ex-post evaluation. In general, monitoring and evaluation help improve future planning policy and interventions through feedback of lessons learned, and the provision of a basis for accountability, including the provision of information to the public [9]. The latter, helps to generate the governability. According to the authors, the monitoring and evaluation process should preferably be carried out by an agency or expert consultants not associated with the projects. This would maximize benefits in terms of credibility in the population and to minimize misuse of resources. With this in mind, the monitoring and evaluation can be a private company subcontracted by the municipality, which reports directly to the municipal authorities and heads of transparency.

In this section it was established that projects, to be successful, need to incorporate the local socio-cultural reality of the system; that is, consider the human population viewed through its ecological context, and as one of many subsystems within a larger ecological system. Not doing so, would finally cause or increase environmental fragmentation; making the local population not to identify with the space and finally to reject it. This aspect is explored in the next section to provide a short theoretical background of the planning model proposed above.

IV. Fragmentation of the Environment

This section is based on Dr. Camacho's theories, methods and practices included in [11], [12] and [1].

When sensory data is intuitively captured by a subject, are readily recognized in the subject's remembrance, allowing the

subject to interpret the environment. Intuitive sensorial capturing begins to be recognized in the subject's mind through the "Semic Act" in the apperception. The subject relates the sensorial information to past experiences, many of which are previously learned experiences, feelings, emotions, knowledge, etc. The senses of apperceptive recognition that cause mental images in the sensitivity are given by all the apprehended and stored information in the remembrance; gathering the sensory captured data through the sensors and the recognition of previous experiences stored in the apperception, thus providing meaning to the sensorial mental images. As the cognitive process increases, so does the complexity of the images.

The human senses (visual, dermal, auditory, gustative, and internal sensations) are sensors that link the sensitive body to the contextual environmental reality. Data grasped through the sensors provide the sensitive sense to the "Semic Act" and stimulates it for the initial recognition of any object or objective situation present in a particular environmental context. During this "Semic Act," the senses relate to the socio-cultural identity of what has been apprehended by the subject. In this manner, the "scanning" of the space is exerted when the transcendental environmental images are captured in the mind through the sensitivity, which sums the immediate perception and previous information from memories, which are products of apprehended and stored data that provide meaning to that that was captured in an apperceptive manner.

The environmental interpretation of urban spaces relates to what was apprehended via past experiences through pragmatic socio-cultural processes, which include daily situations and the way to conduct them based on a series of lessons that guide actions, activities and human acts. This occurs in a way that people identify the environment, but as long as it contains what has been previously learned and valuated through the apperception; thus taking place certain conformity and recognition. Nonetheless, some features of shapes and volumes of the urban configuration are obviated and eliminated from the environmental interpretation if not recognized. Without such information, or features in the mind, contained within the sensitivity process, the unity of the first environmental image is completed. If the information is not complete, the information in the sensitivity would generate a unit that interprets the image, which often is wrong. However, obviated data is excluded and very often mentally eliminated. People foreign to a location and its urban environment learning process, will feel a lack of identity with respect to the perceived space and their interpretation of the space would be confusing.

A confusing environmental image is an environmental fragment that inhibits the interpretation of the environment generated in the urban space. A confusing environmental image, does not allow clarity of unit apperception; leaving behind sensitive data that were not identified in the process. When the environment is not perceived sensibly, a disagreement arises within the subject and his environmental context. The latter causes a lack of recognition of environmental conditions in a given space since they do not correspond to previously learned models accumulated through experiences integrated into the intuitive recognition via the apperception process.

V. Central Aspects of the Urban Regeneration Plan

The most important aspects of the urban regeneration project proposed are discussed in this section. These aspects seek to improve the area in terms of urban environment, mobility and connectivity. In specific, improvements of mobility and accessibility have been shown to serve as catalysts of development and urban regeneration [13]. However, adaptation of local conditions, central part of the planning approach, takes an essential role in the regeneration effort and will be discussed first.

A. Adaptation of the Urban Space to Social and Communal Activities

In section four, the importance of the urban space adaptation to the local context in terms of social and community activities was established. In this subsection, the current socioeconomic aspects are determined along with solutions for their integration into the proposed regeneration project.

During the second half of the XXI, commercial and recreational activities emerged, mainly on a 4-km segment of an unused railway corridor between the abandoned Río Hondo train station[6] and the area known as "El Molinito". This corridor displays interesting areas of intervention due to its geometrical characteristics (e.g. width), configuration of the railway tracks and current activities performed by the local community (i.e. open markets). The configuration of the tracks creates large usable urban spaces, e.g. an operation yard and several passing tracks make the area of the corridor wider at several locations; here spaces for commerce and recreation can be implemented to complement and organize the current socio-economic activities imposed by the local community. In other locations, the tracks pass relatively close to the adjacent river creating spaces for the implementation of new and complementary activities. These spaces are the subject of this study, not only because of the large usable areas they generate, but because they currently contain uses imposed by the local community, which need to be taken into account. In specific, areas running along the river generate interesting spaces for urban regeneration projects and for mobility and leisure; turning the area into a linear park with a series of plazas that provide areas for social and community interaction. The projects are expected to be catalysts of urban development, enhance the current economic activities, consolidate the urban fabric and promote recreation. As mentioned previously, an important catalyst of development is the implementation of a high quality flexible mass transit system that includes a non-motorized transportation (NMT) system (Fig. 4), which at the same time creates the mobility and connectivity within and to the rest of the metropolitan area; allowing economic and recreational activities to take place efficiently. In addition, it increases competitiveness by facilitating easy access to the existing and future commercial activities and services.

[6] Historic railway station built in 1882 under President Porfirio Diaz, who implemented most of Mexico's railway network.

Fig. 4: implementation of mass transit and NMT along the existing corridor.

In Río Hondo daily pragmatic activities already take place and are rooted in the community; hence, it is imperative that what is presented here is met along with the political will to improve the area without altering the community's current dynamics, as well as for the provision of financial support for the improvement, but above all for the activation of the local means of production that bestow life to the "Río Hondo-Molinito" corridor.

B. Sustainable Transport: Mobility, Accessibility and Connectivity

As explained previously, the project seeks to establish mobility, connectivity and accessibility within the intervention area as well as from and to surrounding municipalities and Mexico City. This section provides background information of the area, its social context and existing opportunities for the improvement in regards to mobility, accessibility and connectivity.

In 2006, Mexico's Department of Transportation[7] presented a plan to rehabilitate the abandoned railway line "N"[8]. The plan sought to introduce an intercity train on the existing corridor to connect Mexico City and the city of Toluca. Although the project did not happen, the proposal awoke urban regeneration ideas for the urban space around the corridor. One area identified for improvement is the 4-km section previously mentioned. The area is formed by the railway's right of way and the Avenue "San José Río Hondo," both running parallel to each other until meeting the area called "El Molinito." These two "elements" occasionally approach the river; creating large urban spaces where interventions are possible (e.g. plazas). However, some of the space is currently occupied by semi-permanent structures (Fig. 5); others hold commercial and recreational activities performed by both locals and outsiders on the weekend.

[7] Secretariat of Communications and Transportation

[8] Line N connected Mexico City and the city of Toluca in the state of Mexico; built between 1880 and 1882.

Fig. 5: Existing railway corridor displaying diverse activities and structures within its right of way.

Evidently, the corridor holds non transportation related functions which need to be considered in the regeneration proposal. Important, is to acknowledge the railway corridor which can be reused, especially since it still displays characteristics that makes a rail transportation system viable and sensible. The corridor is on gentle slopes (e.g. 2%) and despite the structures within the right of way; its legal status allows the implementation of a transport system without excessive land acquisition costs or population displacement (Fig. 5).

Fig. 6: LRT operation speed flexibility allowing it to interact with pedestrians in plazas or other spaces.

The idea of introducing the Mexico City-Toluca intercity was revived in 2013 by Díaz González[9] [14]. However, line "N" was not chosen; nonetheless, the study served as confirmation of the corridor's viable characteristics (slopes, right of way, curve radii, etc.) for a high capacity urban rail bounded transportation system (LRT) with trails (pedestrians and bicycles – Fig. 4) that displays flexible speeds for those sections where close interaction with pedestrians is required (e.g. plazas) (Fig. 6) and flexible operation for demand fluctuations (e.g. peak and off peak hours). More importantly, for urban mobility and connectivity, the system connects low income areas in Naucalpan, via a proposed business district, to Mexico City's metro system; opening up new opportunities (e.g. access to jobs). Hence, the intervention goes beyond the original 4 km; extending from the Río Hondo station to metro Station "Refinería"[10] for a total of 9.6-km (Fig. 7).

Due to its high mobility and connectivity, this option provides the opportunity to effectively connect local people to job markets in Mexico City and the local stores to customers from outside the area. Also, linkages to other modes of transport allow the corridor to become intermodal and multimodal, which increases the ridership potential if feeding buses are implemented. The identified linkages, intermodal stations (LRT-bus and LRT-Metro/bus), become nodal points, which represent opportunities for urban regeneration projects that serve as catalysts of development (Fig. 7). The stations are divided in three categories. The first one is a lower passenger flow intermodal LRT-Bus station at key low traffic volume intersections. The second is the higher passenger volume intermodal LRT-Bus station at key high traffic volume intersections (e.g. peripheral ring). Last, the high passenger volume LRT-Metro/Bus intermodal station located at metro station "Refinería" (Fig. 7). Other stations having lower passenger flows provide connections to inclined elevators in coordination with smaller size buses running along the contours of the slopes. These provide service to housing areas on the hills. The inclined elevators, and even simpler solutions like stairs, seek to break urban barriers; improving accessibility, connectivity and mobility. In addition, connecting the area to other parts of the city would increase its attractiveness for investment and tourism due to the river rehabilitation and green corridor. Lastly, an LRT system contributes to the improvement of the local environment by reducing air and noise pollution and by promoting development patterns that provide shorter and better connected trips by NMT or by train [13]; potentially discouraging car usage.

[9] "Analysis of alignment alternatives for the Mexico-Toluca intercity train" in Spanish: "Ánalisis de las alternativas de trazo del tren interurbano México-Toluca".

[10] A connection to metro station "Tacuba "is shown, but as explained below might not be feasible

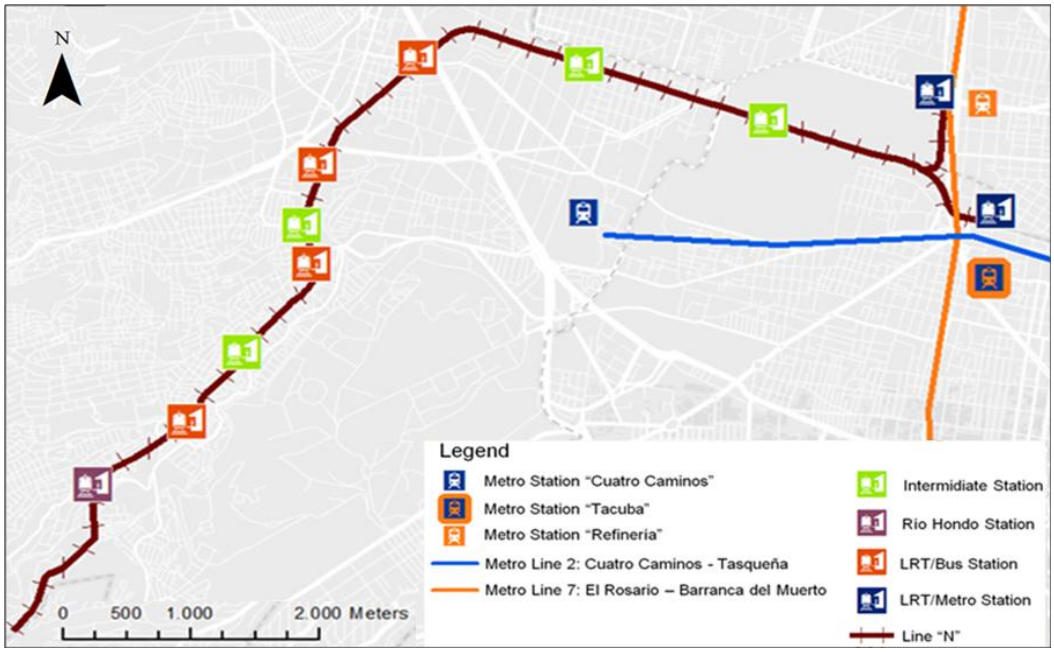

Fig. 7: Existing track and proposed stations and connections to Mexico City's metro system.

C. Urban Landscape Improvement

The improvement of the urban landscape is an important part of the area's regeneration effort, especially in relation to formal aspects such as the provision of horizontal connectivity to the areas within the broken topography of the river's ravines. These connections would provide better mobility and the implementation of attractive landscapes that in general beautify the urban views. In addition, it will allow the provision of vertical connectivity to the slopes through inclined elevators which in conjunction with bus connections would provide an image that improves in an integrated manner and at best, an image full of colors and visual textures.

D. "Río Hondo's" Water Treatment

To make better use of the area, it is necessary to treat the river "Rio Hondo" since it represents an important commercial-touristic-recreational space. Additionally, a clean river indicates a healthy and vital environment, which is able to embrace a continuum of green spaces along the corridor form "Calzada de las Armas," to the town of "San José Río Hondo". However, to further increase the attractiveness of the proposed projects, a renaturalization of strategic parts of the river could be considered. According to the European NWRM, renaturalization of streams can achieve several benefits that include the improvement, in varies levels of efficiency, of the water quality as established by European policies [15]. Moreover, benefits extend to socioeconomic levels by making the river more appealing for the inhabitants [15] through the creation of spaces for leisure and low environmental impact economic activities. However, renaturalization is complex and needs extensive monetary resources, coordination and governance. Nonetheless, treating the river in conjunction with the implementation of the proposed green corridor will form a large multi-functional space which represents a local attractive and clean environment. Furthermore, it helps create a network of green corridors, which connects to Mexico City's green areas and rural areas at the fringes of the Municipality. This alone increases the environmental quality of the Municipality, which severely lacks recreational and open spaces.

VI. Conclusion

The recommendations presented in this paper seek to promote an urban regeneration plan for the area of "Río Hondo" through the implementation of an integrated planning approach that accounts for mechanisms that spark flagship urban projects within the macro urban political, economic and administrative processes. Important is to account for local socioeconomic aspects, political transparency and local environment. These aspects promote acceptance and project ownership within the local population as well as its successful implementation within the morphological, built and natural environmental characteristics and context of the area. Here, mobility, connectivity and urban image improvement assume an important role. In the case of mobility and connectivity, the proposed urban regeneration makes use of an existing transportation corridor which is rehabilitated to introduce an LRT system with pedestrian and bicycle trails. This measure not only is expected to improve mobility and connectivity, but also serve as an important catalyst of investment and development. Another important aspect that improves mobility and connectivity is the creation of open public spaces along "Río Hondo"; these at the same time, contribute to the elimination of the fragmented urban fabric and promote the increase of spaces for social interaction and commerce. It is then that the proposed project integrates solutions that help repair the state of the urban fabric, its form and image. However, n a sense the proposals is only a description of aspects already offered in the area since it is a consolidated urban space with vibrant socioeconomic activities. The intent is to improve the environmental quality of the area given that it is the right historical moment for environmentally friendly

urbanism.

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