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Revitalization and Renovation of Imuris, Sonora Downtown and River

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Abstract

Revitalization and Restoration of the zone composed of the River and Imuris downtown, is a main emphasis of development purpose. Based on a mixed methodology studies, it is intended to achieve a sustainable development on the community, by starting with the redesign of downtown and then, following with the river to revitalize it and built a

recreational river, where residents and non-residents can spend mornings and afternoons enjoying a nice, environmental and sustainable moment. It is focused for all the public, where will be enjoyable to hang out and spend time with friends, couple, kids or all the family.

Introduction

Imuris is located in Sonora, Mexico., an hour away from the Nogales Border. It is a small town with an overall population of 10,541 citizens, 5281 Males and 5260 Females. The size of the municipality is 1,710.3 square kilometers. The size in population is weak compared to the neighboring municipalities, which makes it easier to educate and revitalize the area. The main purpose of the project is to educate the community, redesign downtown, and revitalize and renovate Imuris River; with the right methods of education is intended to encourage people to change, clean, rebuilt and create a small sustainable community.

The three main issues on Imuris, Sonora are Education, Economy, and Environment. As a native from the town and by making observations is noticeable the lack of education from the habitants; most of the society that resides in Imuris have been living there their whole life, and some of them did not had any education., Education is one of the main factors that influences the Economy and the environment to grow and get better, and Imuris is poor on that factor due to there are 275 analphabets aged 15 or older, around 109 minors between 6-14 years not attending to school, 345 inhabitants that did not attended to school, 3412 that not finished school, 1493 that only attended primary school, and 1602 that finished college.

The economy mainly comes from jobs like; mason, butcher, cattle rancher, cheesemaker, or farmer. Imuris is not equipped with libraries, educative centers or educative clubs where people can attend to educate themselves and learn how to create a better economy for themselves and for the community. Imuris have an amazing potential to become a better place to live and a huge potential for growing due that Hermosillo-Nogales Freeway and Agua Prieta- Hermosillo Freeway get crossed in Imuris, also Nogales and Douglas Borders are close to the town and can be a big push to increase the economy. The only issue is that people is afraid of investment in the town because is not a very attractive place and the economic factors are not the best ones.

The Environment is another of the main concerns; There are around 10 grilling restaurants together, where the main material of usage is Carbon; they burn around 30 bags of carbon per day causing a huge amount of pollution on the environment. A sustainable Community has to be always focused on the improvement and beneficence of our environment, but, creating a sustainable community or eco- community is not an easy work to do; first, is crucial to create a master plan of how we will educate residents to make this project a reality. It is necessary to see what does the city or community is in need of. The Municipality is in need of a clean and safe place, where they can feel free, feel relaxed and feel motivated. The Revitalization project in Imuris, Sonora is going to be based on the environment, the community and the economy of the place., by

revitalizing downtown and the river will provide a better-quality lifestyle for many of the residents and will improve education, economy and the environment.

Lit Review

Demographics

The territory of the municipality was occupied by the High-Pimas (tribe). In 1687 the Jesuit missionary Eusebio Francisco Kino founded the town of “San Jose de Imuris” with the category of visit town of the mission of “San Ignacio”, and acquired the municipal category attached to the district of Magdalena de Kino, Sonora at the end of the 19th century. The name Imuris have two different meanings created by Pima tribe, one of the meanings is “mesa entre dos rios” which is means a zone between two rivers. The other meaning of Imuris is “Lomas en Forma de Pedernal” which means mountains in shape of a flint. It acquired the municipal category towards the end of the 19th century ascribed to the district of Magdalena; it was incorporated into the district of Magdalena by Act. No. 68 in September 26 of 1930, and rehabilitated by Act. No. 88 in May 13, 1931.

MAP.

It has an area of 2,171.1 square kilometers that represents 0.92 percent of the state total and 0.09 percent in relation to the national; the most important localities, in addition to their headwaters, are: Campo Carretero, Terrenate, La Estación and La Mesa.

Three rivers cross its territory, which when united form the Magdalena River, these are El Bambuto, Milpillas and El Fresnal; They have permanent flows and also has several streams. The municipality has the Comaquito dam that is located 18 kilometers northeast of the municipal seat and has a capacity of 32 million cubic meters.

Climate

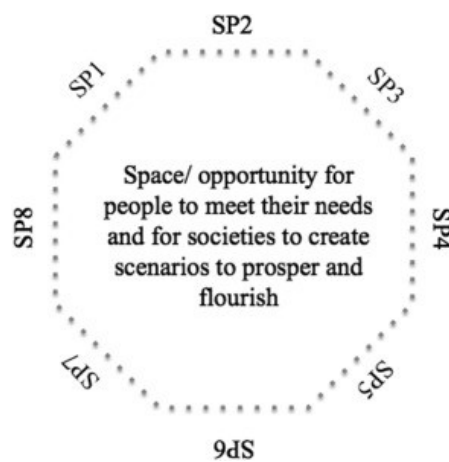
The municipality of Imuris has a dry, semi-warm Bsohw (x) (e) climate with an average maximum monthly temperature of 28.1 ° C during the months of July and August and a minimum monthly average temperature of 10.5 ° C in the months of December and January. The average annual temperature is 18.7 ° C .; the rainy season occurs basically in the months of July and August with an average annual rainfall of 413.1 millimeters. In winter, frost and hail usually appear.

The vegetation of the municipality is very varied, in the east part exists vegetation of desert scrub microphile subinerme and of secondary vegetation. There are large areas of grassland, in the southwestern part the vegetation is crasicaule scrub, predominant among these the saguaro, cardonal, etc. There are also large areas of oak forest and in the region of the Sierra El Pinito, there is pine-oak forest

Sustainable development

Sustainable development (SD) and sustainability make a lot of confusion because of the different meanings of the concepts but sustainable development is referred to the

guidance given to a zone, organization or project of how it should develop a plan based on principles for ecological and social sustainability, thereby also supporting society transition towards social and ecological sustainability. It consists of balancing local and global efforts to meet human needs without destroying and degrading the natural environment. The sustainability principles, act as a curb within which population must work in order to be socially and ecologically sustainable.



“Sustainability is not about flourishing of human life or all need being met, but about the basic conditions that are necessary for the ecological and social systems to not systematically degrade.” (Mark Roseland and Maria Spiliotopoulou, Sustainable Community Planning and Development.)

Social Sustainability

The social sustainability principle is referred to a wide range of aspects such as quality life, healthy equity, livability, human rights, social responsibility, local populations, access to natural resources, access to green spaces, and cultural diversity., but it is

considered the least developed dimension of sustainability. “Re-design towards sustainable practices happens in the creative tension field between social and ecological sustainability, and cooperation to safeguard natural systems relies on viable social systems.” (Mark Roseland and Maria Spiliotopoulou, Sustainable Community Planning and Development). All of the territory covered by sustainability are social; including cultural, political, ecological and economical sustainability.

Environmental Sustainability

Is the capability to keep rates of renewable resource intake, pollution formation, and non-renewable system deficiency that can be continued endlessly.

Economic Sustainability

Is the capability to support a determined level of economic production indefinitely.

Sustainable Development Goals

The SDGs are also known as Global goals of sustainable development, are 17 projected goals by the United Nations. The Sustainable development goals cover a wide variety of social and economic development issues that happen around the world. Some of the issues are social justice, environment, gender equality, water, sanitization, urbanization, energy, climate change, hunger, health, education and poverty.

17 Goals

1. No Poverty.

“End poverty in all its forms everywhere.”

2. Zero Hunger.

“End hunger, achieve food security and improved nutrition and promote sustainable agriculture.”

3. Good Health and well-being for people.

“Ensure healthy lives and promote well-being for all at all ages.”

4. Quality Education.

“Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.”

5. Gender Equality.

“Achieve gender equality and empower all women and girls.”

6. Clean water and Sanitation.

“Ensure availability and sustainable management of water and sanitation for all.”

7. Affordable and clean energy.

“Ensure access to affordable, reliable, sustainable and modern energy for all.”

8. Decent work and economic growth.

“Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.”

9. Industry, innovation and infrastructure.

“Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.”

10. Reduces inequalities.

“Reduce Income inequality within and among countries.”

11. Sustainable cities and communities.

“Make cities and human settlements inclusive, safe, resilient and sustainable.”

12. Responsible consumption and production.

“Ensure sustainable consumption and production patterns.”

13. Climate action.

“Take an urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy.”

14. Life below water.

“Conserve and sustainably use the oceans, seas and marine resources for sustainable development.”

15. Life on land.

“Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.”

16. Peace, justice and strong institutions.

“Promote peaceful and inclusive societies for sustainable development. Provide access to justice for all and build effective, accountable and inclusive institutions at all levels.”

17. Partnerships for the goals.

“Strengthen the means of implementation and revitalize the global partnership for sustainable development.”

Sustainable Design

Sustainable Design is a design process for a product or object intended to be beneficial for the environment during its entire cycle. Sustainable design is intended to reduce human footprint on the environment, and the human health. “The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments.” Sustainable Design. (2018, March 29)

Principles

- Improve site potential.
- Reduce non-renewable energy intake.
- Use environmentally friendly products.
- Protection and reduction of water.
- Increase indoor environmental quality.

- Enhance operational and maintenance systems.

Prevention and Precaution for Sustainable Design.

Life cycle analysis (LCA), Leadership in Energy and Environmental Design (LEED), and Ecological Footprint are tools, methods, or evaluation systems that help identify the risks of projects. “The principle of prevention states that if the probability of a threat and the types of consequences of an activity are known, then measures must be taken to prevent any further harm to the environment society” Cucuzzella, C. (2016)

	Preventive approach FOR sustainable design inquiry understanding the “what is”	Precautionary approach FOR sustainable design inquiry understanding the “what can be”
Purpose of evaluation process	Collecting evidence for optimization (statistically constructed)	Exploratory – regarding the transformation of practice and structures (socially constructed)
Addressing uncertainty in process of inquiry	Known level of certainty of knowledge will be used to make decisions	Addressing uncertainty and contradictions nourish process
Types of uncertainty	Technical, methodological (data unavailability, method inadequacies)	Epistemological (indeterminate, incommensurable)
Type of consequences	Predictable, repeatable outcomes considered	Non-linear, non-substitutional, recursive, repercussions considered
Elements of concern (risks)	Resource and planet preservation, social-economic fairness, and cost-benefit analysis (normative and technical)	Ecological integrity, place identity and the individual, well-being, social cohesion, cultural and community life, transformative behaviour – (ethical, aesthetic and technical)
Type of inquiry	Systematic inquiry	Systemic and iterative (co-learning taking place within team)
Time frame/pace	Matches corporate pace	Matches nature's (civilization) pace

Imaginary of design	Functional and flexible	Organic, fluid, context specific, tactile, sensory, pluralistic
Type of innovation	Technical innovation (efficiency – doing it right)	Technical, social, cultural, educational, and organizational innovation (ethical – doing the right thing)
Design strategy	Reduce energy, reduce social injustice, and reduce footprint, conservation of resources and environment and social structures	Express nature, contextual, living building/artefact, create identity, community and cultural revitalization, environmental regeneration
World view	Deterministic (causal effects) world view	Complex (dynamic and interconnected) world view
Methods	Systematic thinking (using tools such as, LCA, SLCA, EIA, SIA, LEED, Ecological Footprint)	Systemic thinking (using approaches such as Integrated Design, Collective Decision Making, and by drawing on (and not founded on) the more systematic tools)

Cucuzzella, C. (2016) 1

Levels of Sustainable Innovation.

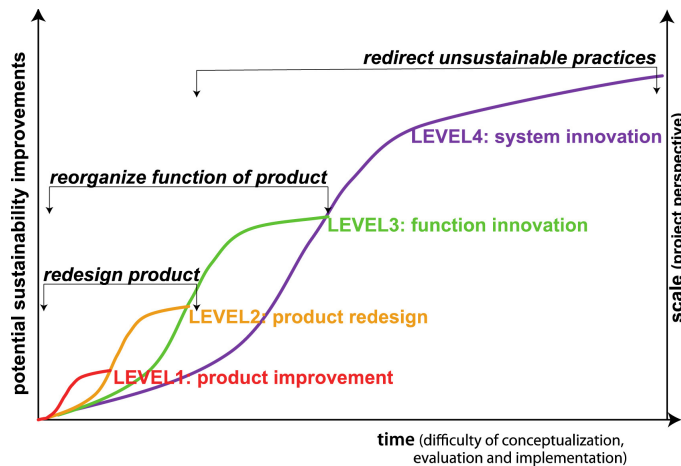


Figure 1. Design for sustainable innovation (based on: Janin, 2000; Bretzel 1997; Dewberry, 1995; Fletcher et al., 2001)

Sustainable Street Design

Four goals for achieving sustainable Transportation on streets.

- Decrease carbon Footprint and reduce the amount of energy use.
- Prepare and arrange land use and transportation for a better way of achieving sustainable objectives.
- Achieve "better than before" outcomes for our towns, municipalities and for the natural environment.
- Apply innovative, sustainable practices in the development and delivery of transportation services.

Greenberg, E., A.I.C.P. (2008).

Movement: The movement of both, people and goods and by all modes of trip purposes and types. Sustainable streets augmented the use of at least-polluting modes and reductions in vehicle-miles traveled. *Greenberg, E., A.I.C.P. (2008).*

Ecology: The resource value of landscape and its essential elements in the right of way as well as the broader set of ecological procedures changes by the movement system supports by the street, the water, the air, and climate impacts of vehicles with carbon emissions. Sustainable streets protect and complement natural resources and processes. *Greenberg, E., A.I.C.P. (2008).*

Community: Social, public health, cultural, economic and aesthetic considerations as well as environmental law. Consistent with the fundamental rights of context-sensitive

solutions, sustainable streets that emulate community values and support urban development arrangements that reinforce movement goals. *Greenberg, E., A.I.C.P. (2008).*

Sustainable Street Strategies

Permeable Pavements: Absorbent or permeable streets infiltrate, treat, and/or store rainwater where it falls. They can be designed and built of pervious concrete, permeable interlocking paver, or porous asphalt. Permeable pavements could be cost effective when land prices are high and flooding or icing an issue. *Greenberg, E., A.I.C.P. (2008).*

Green Streets and Alleys: Are created by integrating green infrastructure elements into their design to store, infiltrate, and evapo-transpire storm-water. Permeable pavement, bios-wales, planter boxes, and green features (e.g. Grass, trees) are among the elements that can be interlaced into street or alley design. *Greenberg, E., A.I.C.P. (2008).*

Green Parking: Many green infrastructure elements can be seamlessly integrated into parking lot designs. Permeable pavements can be installed in sections of a lot and rain gardens and bios-wales can be included in medians and along the parking lot perimeter. Benefits include mitigating the urban heat island and a more walkable built environment. *Greenberg, E., A.I.C.P. (2008).*

Bios-wales: Bios-wales are vegetated channels that provide treatment and retention as they move storm-water from one place to another. Vegetated swales slow, infiltrate, and

filter storm-water flows. As lined features, they are particularly well designed to being placed on streets and parking lots. *Greenberg, E., A.I.C.P. (2008).*

Promoting Walkability

Creating a walkable environment and improving walkability with strategies that are meant to solve numerous problems from the obesity crisis and a lack of central city vibrancy to traffic congestion, environmental injustice, and social isolation. Walkability is about the outcomes or performance of such walkable environments, by making places lively and sociable, and enhancing transportation options, or inducing exercise. *Forsyth, A. (2015).*

Nine Themes Unpacked

1. Traversable.

The definition of walkable places as traversable or suitable for walking turns out to be a very basic physical infrastructure to get from one place to another.

Forsyth, A. (2015).

2. Compact or Close.

A related but a little bit different definition of one zone is that is being walkable

and the destinations are close one from another. *Forsyth, A. (2015).*

3. Safe.

The lack of safety is a key barrier of walkability; e.g. street signs, speed regulation, sidewalks, and safe crossing are essential for walkability. *Forsyth, A. (2015).*

4. Physically enticing.

A walkable community have to have physical enticing which means that you can see a diversity of landscaping. It has to be traversable, compact and safe., also rich in pedestrian oriented infrastructure, vegetation, benches, and trash cans.

Forsyth, A. (2015).

5. Lively and sociable.

Walking and socializing at the same time has to be involved with a walkable, nice, and open space where socializing is found enjoyable. *Forsyth, A. (2015).*

6. Sustainable transport option.

Walkability is taken as a sustainable method of transportation, but with the addition of bicycle lanes is quite a bit better. *Forsyth, A. (2015).*

7. Exercise inducing.

A walkable environment is related to exercise inducing due to the body movement, but also it is good idea to do running or cycling. *Forsyth, A. (2015).*

8. Multidimensional and measurable.

Measuring walkability makes you feel the success of walk-score. *Forsyth, A. (2015).*

9. Holistic Solution.

Walkability can be a reward for the better environment and generate investment, and more sustainable outline. *Forsyth, A. (2015).*

Case Studies

Movement Plus: Higher-Volume Streets Aurora Avenue, Shoreline, WA, USA

The revitalized Avenue made its changes based on walkability promotion, designing auto oriented streets to be more sustainable responsible for the needs of pedestrians, bicyclists, and drivers. Also, it improves the environment by reducing carbon footprint and provides a more healthy and enjoyable environment for the residents. Some of the designed and implemented strategies on the project are: Sidewalks, landscaping, lighting, storm water management features, two pedestrian/bicycle bridges, access management, intersection capacity improvements, and construction of curb lanes dedicated to business access and bus movement. A. (2017, July 27).



Downtown Revitalization Plus.

Riverfront parkway and downtown streets, Chattanooga, TN, USA

To revitalize Chattanooga downtown it was used street design as the main purpose/issue/element. The reconstruction was based on redesigning the street from a five line to a two-lane access with on street parking, sidewalks, and crosswalks. It was described as a major change for the city because before the change it was felt like a highway instead of a road. A. (2017, July 27).



Revitalization of Los Angeles River Los Angeles, California

The river due to its bad design, created several flooding's causing millionaire damages as several deaths. The length of the river is around 51 miles, 32 in LA. The motivation

for getting this river revitalized was because they wanted to offer a more sustainable, green, and enjoyable place by adding parks, trails, recreation, environmental restoration, economy, tourism. The responsible associations are the city of LA, the county of LA, and the US Army corps of engineers which paid for the construction., the LA River falls is in charge of cleaning the river. The economy got increased, the population increased and it brought happiness on an enjoyable, green and sustainable recreational zone. *Los Angeles River Revitalization. (n.d.)*



Methodology

This project uses a Mixed methodology: Triangulation, which involves both of the methodologies: Qualitative and Quantitative. Qualitative methodology for the determination and purpose of the project due to research of what is intended to reach. Quantitative methodology is due to some interviews, and data collection from habitants of the community.

Steps:

1. Research about Imuris Sonora, Demographics, and observations on Google Earth.
2. Field trip to Imuris Sonora.
 - Field trip to the River, collection and observation of the weak and strong points,

- and the problems the river is facing up.
- Interviews.

Developing my own research on databases the main purpose was to improve my knowledge about what implementations could be applied on the project. There were two focuses on the research for the revitalization of two different zones in Imuris, that amazingly are connected and makes them a recreational zone combining them together. The research helped me to find strategies, methods, and ideas to make the project and design work. As mentioned before, Imuris, Sonora is a small town with a small population where the lack of education is unbelievable., due to the information collected I planned a field trip to the municipality to make interviews about what they like about downtown and river and what they don't like. By presenting the plans and giving them some information of what sustainability is and the purpose of the project., most of the interviewed habitants agreed with the focus and purpose of the project.

Data

Residents Survey	Yes	No
Do You like the Imuris Center?	33	67
Do you know the meaning of sustainability?	30	70
After knowing the meaning, would you like sustainable changes in Imuris?	80	20
Do you like this site plan, of how it is planned to look like in a future?	90	10
Would you like to have a sustainable river?	89	11

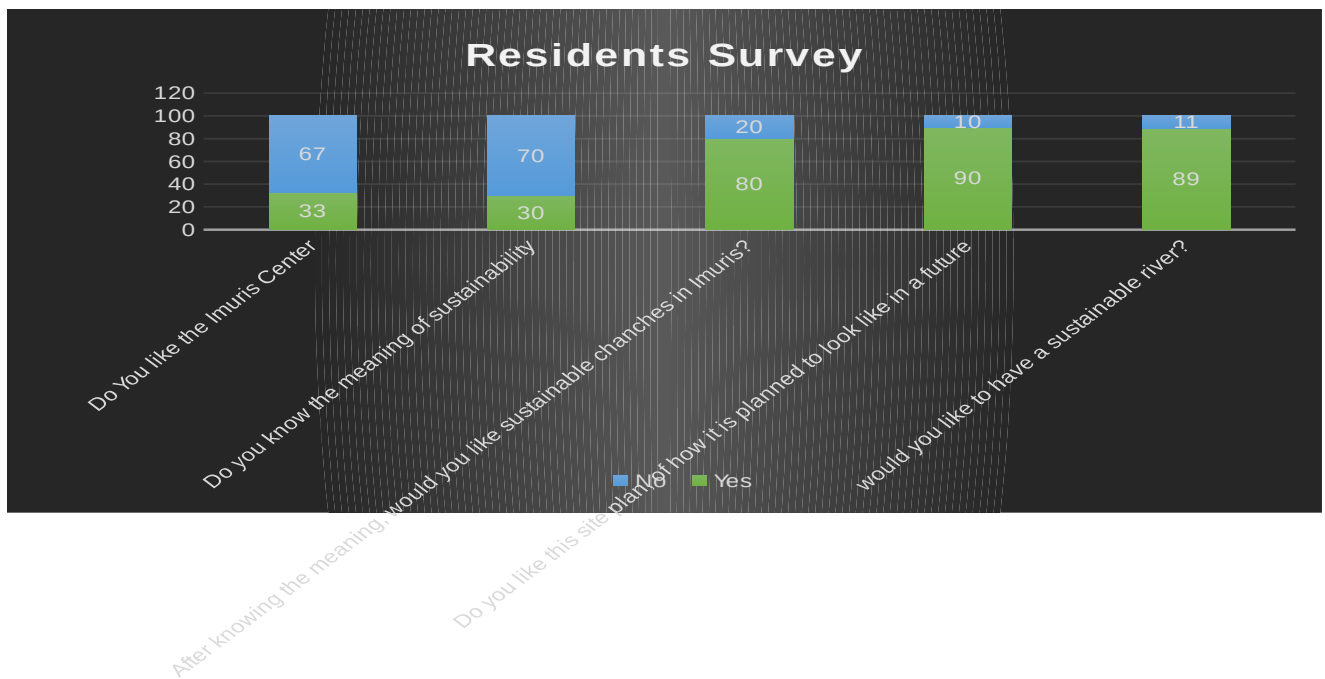
Table 1

	Waste Water	Trash	People	All
What do you think is the problem with the river?	20	30	10	40

Table 2

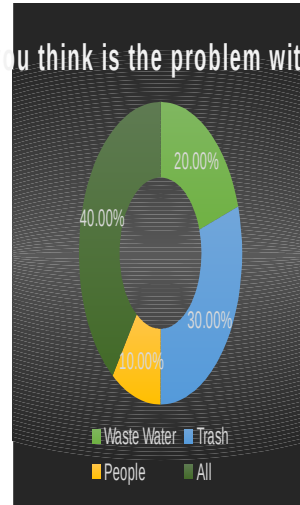
	Streets	Sidewalks
What would you change/add on the Center?	75	25

Results



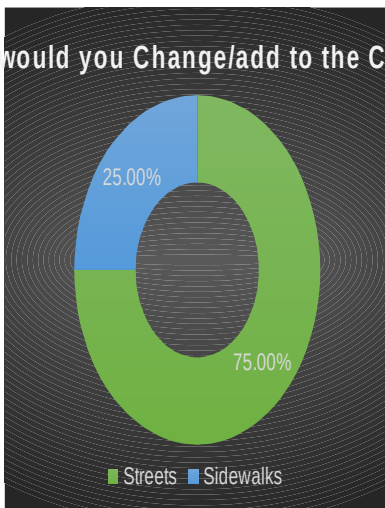
Graph 1

What do you think is the problem with the river?



Graph 3

What would you Change/add to the Center?



Graph 2

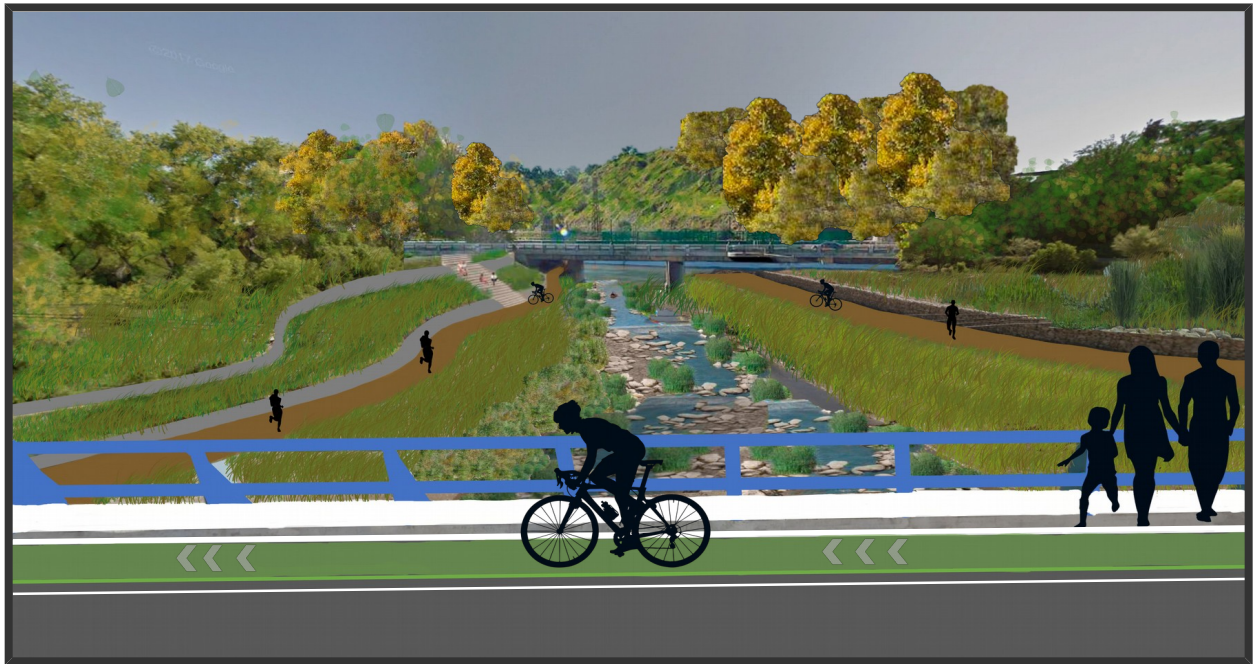
Designs



Result 1. Streets on the zone are not perfectly aligned and the traffic flow., goes as it comes. Residents and nonresidents do not follow any rules because there aren't any street signs for regulating traffic. By adding a roundabout, traffic signs and bike lines, drivers will be more careful.



Result 2. Aurora Street is the connection between Downtown and the River., The plan is to encourage walkability and bicycling on the zone for a healthier lifestyle and environment.



Result 3. The plan is to close any entrance for cars, redesign and revitalize the zone in a environmentally friendly recreational zone. People will enjoy the river, the environment and company.

Discussion

How Is Intended to Achieve the Goal?

With the methodology made and all the information collected, the purpose is to start with education and development, that way residents and nonresidents can see, realize and appreciate the project. And if everything goes in a good track, people will start contributing and it will make the project easier. As shown on the diagrams on top, the river and downtown will give 360 degrees change for a sustainable and better-quality lifestyle for the residents.

Benefits:

- Decrease Carbon Dioxide Pollution.
- Healthy weight, strength of bones and muscles.
- Relaxation

- Economy.
- With the presence of sidewalks (promoting walkability) the value of properties increases, plus promote tourism by adding local restaurants and local shops.
- Better Social interaction and communication.

Conclusion

The renovation of the center of Imuris, Sonora will increase the number of visitors, will increase the economy and will create a better-quality life for the residents of the community. By revitalizing and renovating the zone on the Imuris river and downtown people will be more motivated and encouraged to save the community and the planet. People will have a better-quality life, environmentally, socially, economically and in health terms. Based on all the research and data collection done it is a liked project by the residents and because they strongly believe that Imuris need a change. It is needed to pay attention to the small details of the project due that we don't want any failing project, most likely we will have to partner with architects and other people to make this project happen.

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