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San Juan City, Sustainable Smart City on the Rise: A Case Study

可持续发展的智能化城市圣胡安市: 案例研究



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Felino "Jun" Palafox Jr. is an International Associate of the American Institute of Architects, member of the Urban Land Institute, American Planning Association, and the U.S. Green Building Council. With more than 900 projects in 37 countries, his firm, Palafox Associates ranks 89th in the top architectural practices in the world and top 8 in Leisure projects, according to the BD World Architecture of London for 2012. He is currently a Fellow for the Council for Tall Buildings and Urban Habitat.

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Abstract

Reforming a city is a monumental task, one that requires a strong political will, an engaged populace, and a smart plan. When Palafox Associates was tasked in creating a Comprehensive Land Use Plan and Zoning Ordinance (CLUPZO) for a small and congested city of San Juan in Metro Manila, the firm placed emphasis on a paradigm shift towards environmentally-sound planning strategies as a responsive measure to climate change and its growing urban population that is expected to saturate Metro Manila before 2021. The project's general focus is to make the public aware how the city's urban landscape may be improved through disaster preparedness, improved urban mobility, vertical urbanism, introduction of mixed-uses, creation of new and potential urban centers, urban revitalization of the city's waterfront, application of traffic management systems, and pedestrianization. The Smart City Plan hopes to transform San Juan from a vulnerable city into a sustainable smart city.

Keywords: Urban Planning, Architecture, Vertical Urbanism, Adaptive Architecture, Smart City, Sustainable City

摘要

城市改革是一项艰巨的任务，需要强大的政治意愿，民众参与以及周全的计划。Palafox的任务是为马尼拉圣胡安这个小而拥挤的城市制定《综合土地利用规划和分区条例》(CLUPZO)，事务所将重心从典型案例转变为环保规划策略，以此作为响应措施来应对气候变化和不断增长的城市人口，预计在2021年前马尼拉人口数达到饱和。项目的总体工作重点是使公众了解城市景观将通过防灾得到改善，改善城市交通，提倡垂直城市主义，引入综合运用，创建全新的或潜在的城市中心，改造城市海滨，运用交通那个管理系统及行人专用区。智能化城市计划希望能将脆弱的圣胡安市改造成一个可持续化发展的智能城市。

关键词: 城市规划、建筑、垂直城市主义、适应性建筑、智能化城市、可持续发展城市

Historic and Revolutionary

San Juan is a historically vibrant city at the heart of Mega Manila. It is the site of two significant events that guided Filipinos towards freedom and democracy. This heart-shaped city is often regarded as the "metro centro," and is highly accessible to the rest of Metro Manila, serving as a major thoroughfare to other cities (See Figure 1). Due to its location and accessibility to and from all point of the region, San Juan has attracted many migrants from other areas. Its waterfront is approximately 10.5 km and has a great potential for development. San Juan is mostly made up of adobe and rocks. The tuffaceous volcanic soil has incredible ability to hold water, making the terrain of the city ideal to for urban development and will hold well against earthquakes (Palafox Associates, 2012).

The city officials practice good governance, affirmed by the numerous accolades it has received, most notably as the No. 1 Highly Urbanized City in Metro Manila in terms of performance in 2012, evidenced by the 65.5% increase in new establishments from 2007-2011 and 93.3% employment rate, due to

历史和革命

圣胡安市是历史上一个充满活力的城市，位于马尼拉的中心位置。它是领导菲律宾人民走向自由和民主的两大重要事件的发生地。这一心形的城市通常被视作“地铁中心”，可非常方便地到达马尼拉的其他地方，被作为通往其他城市的主要道路（见图1）。介于其特殊的地理位置和出发或到达所有地区的便捷性，圣胡安市吸引了许多来自其他地区的移民。它的海岸线长约10.5公里，具有很大的开发潜力。圣胡安主要由泥砖和岩石组成。凝灰质的火山土具有超乎想象的持水能力，是城市开发的理想地形，且能很好的抵抗地震（Palafox Associates, 2012）。

市政府有效地管理和实施，收到了无数称赞和肯定。最显著的是2012年根据城市表现，圣胡安市被评为马尼拉第一高度城市化的城市，数据证明在2007-2011年期间，由于政府创造了各种就业计划，新增了65.5%的公司，就业率增长93.3%。此外，现今圣胡安市的工业企业正逐渐转变为强大的零售和服务行业，其配套设施如学校和医院都按城市的高标准建设。

the various job creation programs by the city government. Moreover, industrial businesses in San Juan are now shifting to a strong retail and service industry, and support facilities such as schools and hospitals in the city are of high standards.

Being one of the smallest cities in the metropolis, the city of San Juan has a limited land area with an extreme lack of open space. The river and “esteros” are also extremely polluted and certain water body easements are encroached by informal and formal settlers. Likewise, the drainage and sewerage system are inadequate, aggravating the incidence of flooding in the area. Traffic congestion is also prevalent due to the high volume of traffic and narrow streets. Parking facilities are also insufficient and disorganized. Moreover, San Juan defines its essential land use as a residential development, underlying its potential as a commercial and historical tourist hub. High blank walls are also common along with close-gated subdivisions.

Just like the historic 19th century revolutions against the colonial superpowers, San Juan is once again embracing revolutionary ideas in architecture and urban planning with its Sustainable, Smart City Plan of the future. Instead of the traditional means of making the plan work through restrictions and emphasizing penalties and negative feedback, Palafox Associates encouraged effective governance through stimulation rather than restriction. Palafox Associates created a framework that is causing a great and complete change in San Juan by designating where vertical development will be situated, and which development areas can be intensified using tools like FAR incentives and following development principles like compact development transit-engaged development, and pedestrianism, principles which are only starting to gain ground in the Philippines.

Envisioning a Better, Smarter San Juan

Through the use of participatory planning, Palafox Associates cooperated and coordinated with the San Juan City Government and City Council, inviting various stakeholders from the business sector, academe, government agencies, social civic groups of San Juan to participate in the city’s public consultations. Four public consultations were done, and the first one, held in 2012, banded the stakeholders in a visioning workshop and SWOT analysis of the city (see Figure 2). Palafox Associates used the results of the workshop and analysis, conducted further research and studies on the city’s development growth, performance, policies, and programs, and came up with three framework strategies that the participants examined (see Table 1).

作为大都会中最小的城市，圣胡安市土地面积有限且极其缺乏开放空间。河流和“埃斯特罗斯”被严重污染，某些水域已被非正式和正式移居者所侵蚀。同样的，排水和污水处理系统的不完善，加重了该地区的洪水发生率。大流量的交通运输和狭窄的街道造成了交通拥堵的普遍现象。停车设施也严重不足，混乱无序。此外，圣胡安市将其必要的土地用途定义为住宅开发，埋没了其作为商业和历史旅游中心的潜能。随处可见高大的白墙，大门紧闭的住宅小区。

就像十九世纪反对殖民大国的革命，圣胡安市再次掀起了有关建筑和城市规划——未来可持续发展智能城市的改革思潮。Palafox Associates通过激励而不是限制，鼓励有效地治理，取代了传统的通过限制，强调惩罚和负面反馈的方式制定计划。Palafox Associates构造了一个规划框架通过一系列方式彻底改变了圣胡安市，如：标明垂直发展的位置，以及哪些开发区域可利用容积率奖励的方式加强开发。贯彻集约开发原则，如交通运输开发和步行原则，并开始在菲律宾内普及。

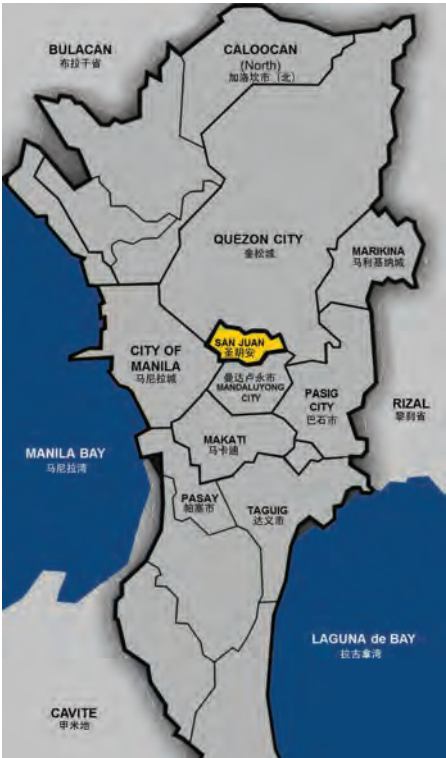


Figure 1. San Juan is the smallest city located at the geographic center of Metro Manila, an urban megalopolis. (Source: Palafox Associates Library)
图片1. 圣胡安是位于马尼拉最小的城市，位于这一大都市的中心位置。(来源:palafox 同伙库)

	Scheme 1: Multi-Nuclei Business District Development	Scheme 2: Transit-Engaged Development Corridors and Wedges	Scheme 3: Cluster Specialization and Waterfront Development
GRAPHICAL REPRESENTATION			
Objective	To create three distinct and concentrated central business districts that will prioritize the intensification of commercial and mixed land uses.	To create Transport-Engaged Development (TED) centers that will intensify mixed- and commercial uses in its proximity (wedges) but also increase mobility and accessibility to link to other centers.	To create themed communities based on the specific specializations of each.
	To identify and designate areas for expansion of the three business districts.	To create an efficient multi-modal transport corridor to ease accessibility and circulation to various parts of the city.	To identify and propose sites of the current and potential urban centers within these communities.
			To focus on river- and creekside areas for waterfront and open-space development for leisure and outdoor recreation.

Table 1. The three development framework schemes for the city of San Juan. Stakeholders chose to develop San Juan’s Cluster Specialization and Waterfront Development. (Source: San Juan Comprehensive Land Use Plan and Zoning Ordinance, 2013-2023)
表1. 圣胡安市的三个框架计划方案。利益相关者选择开发圣胡安的特殊集群和海滨。(来源:圣胡安综合土地使用计划和分区条例,2013-2023)



Figure 2. Arch. Felino Palafox, Jr. discusses with local stakeholders and real estate developers during the public consultation about their vision for San Juan City (Source: San Juan Comprehensive Land Use Plan and Zoning Ordinance, 2013-2023)

图2. 建筑师Felino Palafox, Jr.在公共咨询会期间与当地利益相关者和房地产开发商讨论他们对圣胡安的愿景(来源:圣胡安综合土地使用计划和分区条例,2013-2023)

The stakeholders chose the Community Specialization and Waterfront Development for its framework strategy which placed focus on the development within the major centers as well as the prioritization of waterfront development (see Figure 3), stimulation of built-up developments along major roads, clustering of predominant land uses, and the prioritization of efficient transport systems. A more compact type of development which entails an optimized use of land resources is desired for the city.

This new development framework became the basis of the formulation of the San Juan City CLUPZO. The city was categorized into the following zones: the residential zone, commercial zone, institutional zone, socialized housing zone, planned unit development, multi-use zone, cemetery zone, utility zone, water zone, and parks and recreation zone.

No plan would be implemented successfully without proactively involving its constituents. Public consultation meetings and workshops have been conducted by Palafox Associates over the course of the planning formulation. With a more cohesive stakeholder linkage, it became easier for the firm to facilitate arriving at a common goal of cooperative stewardship for the environment especially on flood prevention programs. The envisioned Plan is a green, walkable vertical city of the future with plenty of trees, high-rises, and elevated walkways and monorails. Unity became a powerful statement that through working together, it ensured that the plan for a sustainable, smart, and flood-free San Juan can be realized.

Once it was clear for the constituents and officials that one of the best directions for San Juan is to go vertical, incentivizing programs were included in the plan in order for the plans to work smoothly.

The plan supported changes in lifestyle for its residents by decreasing dependency for motorized-transport use and shifting to healthier walkable and bikeable alternatives through planning mixed-use zones. In this walk-to-work lifestyle, places of living were made closer to places of making a living.

Among the San Juan CLUPZO's proposed plans and policies called for:

- Mixed-use developments to locate places to live, work, play, dine, and shop in close proximity
- Vertical urbanism instead of urban sprawl to encourage more compact high-intensity development (see Figure 4)
- Incorporation of revolutionary ideas in urban planning such as transit-engaged developments, incentive zoning,



Figure 3. The existing (top) and proposed (bottom) waterfront development for the San Juan River, showing a better respect of the easement by relocating informal settlers and transforming the old abandoned industrial structures into a tourist attraction and recreational amenity. (Source: San Juan Comprehensive Land Use Plan and Zoning Ordinance, 2013-2023)

图3. 圣胡安河滨水开发现状(上图)和建议(下图), 通过重新安置非正式移民及转移废弃工厂建造旅游景点和休闲设施, 展示了良好的风貌。(来源:圣胡安综合土地使用计划和分区条例,2013-2023)



Figure 4. The existing Annapolis Avenue (top) with its obstructed sidewalks and diagonal parking. This area often becomes congested with traffic serving as an entry point to the city. The proposed Annapolis Avenue (bottom) aims for a balanced developments that are of a walkable human scale. (Source: San Juan Comprehensive Land Use Plan and Zoning Ordinance, 2013-2023)

图4:安纳波斯大道现状(上图), 阻塞的人行道和对角停车位。这一区域作为城市入口, 经常发生交通拥堵现象。安纳波斯大道建议(下图), 目的是平衡发展人性化尺度。(来源:圣胡安综合土地使用计划和分区条例,2013-2023)

inclusionary development, smart growth, new urbanism and flood overlay zoning

- Strict implementation of easements as a flood-proof measure
- Promotion of sustainable development through green architecture such as green roofs and walls, urban agriculture, solar panels, and rain water harvesting facilities
- Preservation of green open spaces
- Application of Floor Area Ratio instead of imposing building height restrictions
- Integration of disaster preparedness and mitigation program in urban planning
- Traffic management and improvement strategies such as elevated walkways, tram system, motorist notification and advisory, and parking policies.

Sustainable and Profitable Vertical Urbanism

The plan called for vertical urbanism and mixed-use compact communities as alternatives to the horizontal sprawling developments, which is the prevailing land development and real estate trend in the country. Vertical urbanism was the most rational option to multiply the available land of the city, while preserving horizontal spaces, which were prioritized for trees and foliage as flood-proofing and mitigation measures. To minimize casualties for residents in flood-prone areas, development and adaptive architecture policies such as living quarters to be situated on the second floor were also incorporated for dwellings indicated in the flood overlay zone map of the CLUPZo.

The project advocated a paradigm shift, especially on the change of attitudes the leaders and decision-makers within the city government and its residents. The shift was that implementing climate change adaptation programs would be more efficient through stimulation than restriction. Hence, incentivizing programs were the best direction in order for the plans to work smoothly.

The developed Sustainable Smart Plan for San Juan created by Palafox Associates proposes vertical urbanism to encourage a more compact, high-rise development. Developers will pay a development charge of 2,100 PHP (365 HKD) for every square meter of building floor area above the Floor Area Ratio (FAR).

The development charge, also known as the development impact fee, will help generate funds and promote pedestrianization for growth centers. By implementing Development charges, wherein the computation for the development charge shall be based on a set rate per square meter of development, the collected funds shall be used to provide, improve or maintain services and infrastructures such as sidewalks, traffic management, elevated walkways, landscape improvements, drainage, sewerage, and other public amenities. For those that do not want to build high-rises, they can sell their air rights. Among the other provisions of the plan are incentive zoning, inclusionary development, smart growth, new urbanism, public-private partnership, flood overlay zoning, interdisciplinary approach, and the Triple Bottom-line approach.

When Palafox Associates, together with Skidmore, Owings, and Merrill (SOM), created the architectural design and masterplan for Rockwell Center, an upscale mixed-use brownfield development in Makati City, land used to sell for just 8,000 PHP (1,392 HKD) per square meter. Today, the lots in Rockwell Center sell for 200,000 PHP (34,799 HKD) per square meter.

构想一个更好、更智能的圣胡安

通过参与式规划, Palafox Associates与圣胡安市政府和议会合作协商,邀请了来自商界、学术界、政府机关和社会团体的利益相关者共同参与城市的公众咨询会。咨询会已举办了四次,第一次举办时间是2012年,这些利益相关者聚集在研讨会中进行分析城市SWOT分析(见图2)。Palafox Associates利用研讨会的分析结论,对城市的发展、绩效、政策和功能进行了深入探讨和研究,经参与者实验得出了三个框架策略(见表1)

这些利益相关者选择社区专业化和滨水开发作为框架策略,将重心放在主要中心区的开发和滨水开发的优先级上(见图3),刺激沿主要道路的组合开发,群集主要的土地用途并优先安排高效的交通系统。紧凑式的发展引起土地资源使用的优化,这便是理想中的城市。

这一全新的发展体系成为了圣胡安市《综合土地利用规划和分区条例》的规划基础。城市被分为如下区域:住宅区,商业区,机构区,社交房屋区,计划单位发展,多用途区,墓地区,公共设施区,水区和公园及休闲区。

缺少主动参与,任何计划的实施都不会成功。公众咨询会和研讨会在规划制定的过程中由Palafox Associates主持。有了更具凝聚力的利益相关者的联系,事务所便很容易达成共同目标共同管理环境,尤其是防洪计划。计划设想未来城市将是绿色、步行垂直城市,绿树成林,高楼林立,有高架人行道和单轨铁路。通过共同合作,团结将是有利的证明,它确保圣胡安市实现了可持续发展、智能化及不再遭受洪水灾害。

一旦选民和官员清晰地认识到这一点后,圣胡安市的最佳发展方向就是纵向发展。为了使工作进行顺利,激励机制也被列入计划中。

计划支持居民改变其生活方式,在综合规划区内,降低他们对机动车交通工具的依赖,从而转变为更健康的步行或自行车代步。这种步行工作的生活方式使生活地更接近工作地。

圣胡安《综合土地利用规划和分区条例》拟议的计划和政策要求:

- 综合开发近距离定位生活、工作、娱乐、餐饮和商店的位置
- 垂直城市主义代替城市扩张,鼓励更多的紧凑型高强度开发(见图4)
- 在城市规划中结合改革思想,如交通运输的发展,鼓励分区,包容性发展,智能化发展,新城市建设和洪水覆盖分区
- 严格执行地役权作为防洪措施
- 通过绿色建筑如绿色屋顶和墙面,城市农业,遮阳板和雨水收集设施促进可持续发展
- 维护公共绿地
- 应用容积率而非加强建筑高度限制
- 整合城市规划防灾减灾计划
- 交通管理和完善策略,例如高架步道,有轨电车系统,司机通知和咨询以及停车政策。

可持续、可盈利的垂直都市发展

所谓垂直城市化或者综合紧凑型社区计划的水平蔓延发展,是国内现行土地开发和房地产趋势。垂直都市是增加城市可用土地的最理性选择,同时又保证了水平空间,为防洪减灾措施所需的树木和植物提供了空间。为了最大限度的减少洪水易发地区的人员伤亡,发展和自适应体系的建筑政策,如居住在宿舍四分之一

In the aspect of social inclusivity, the lack of affordable housing and income differential has forced the poor and key workers to be priced out of the metropolis and travel up to 3 hours to get to work. This is exacerbated by the state of urban mobility where less than 20% of people in Metro Manila travel by car (nationwide it's 2%) yet transport policies and projects all favor car use. To address these problems, affordable medium-rise housing for key-workers, with a 40% open space requirement, was designed within the city just across the government center. The increased awareness of the informal settlers to concepts of inclusive zoning and adaptive architecture has inspired them to green consciousness.

The additional buildable area gained from Floor to Area Ratio (FAR) can be used to adopt designs to mitigate flooding. The city of San Juan has an average FAR of 0.5 - 1, meaning that most developments in San Juan range one-three stories, and are typically residential, caused by suburbanization. The FAR will be specific per area because of the carrying capacity of the road (width of the road proportional to the population within it), encourage compatible uses and amenities, and control building density. Different land uses will have a different percentage to use the lot or site: 50-80% of the lot for Residential, 70-90% of the lot for Commercial, and 60% of the lot for Institutional. Variances occur due to site specific instances, among them, site design or re-blocking of plots, architectural design, and history of the area (see Figure 5).

San Juan adopted a Percentage of the Lot Occupancy (PLO) of 60% for most of its city lots. The remaining 40% of the site will be for green open spaces, utilities and infrastructure, pedestrian sidewalks, and service roads.

The current building height limits in San Juan for medium density residential zones is 21 meters while 10 meters for low density commercial zone. Because of the assigned FAR, no building height limits were proposed. FAR bonus incentives shall be available to all developers that will provide facilities/amenities for public benefit.

Another aspect considered in the San Juan CLUPZO is the transfer of development rights. Transfer of Development rights can improve the economy by providing a beneficial trade between the buyer and seller of Air Rights (see Figure 6).

The transfer of development rights, development space, expressed in terms of FAR, can be transferred from one lot (the transfer lot) to

处——二楼也被纳入《综合土地利用规划和分区条例》洪水覆盖区域地图内。

项目提倡思维模式的转变，特别是政府和居民中的领导者及决策者的态度转变。通过鼓励方式执行气候变化适应计划这一转变，远比限制更有效。因此，激励计划是使工作顺利开展的最佳方向。

由Palafox Associates制定的圣胡安市可持续发展智能城市计划提出垂直城市主义，鼓励更多紧凑和高层发展。超过容积率的建筑面积，开发商将支付每平方米2100比索 (365港币) 的开发费用。

开发费用，也被称做开发影响费，将有助于筹集资金，促进经济增长中心辟设行人专用区。通过实现开发费用，其中开发费用是根据每平方米开发设定的费率来计算的，筹集的资金将被用于提供、改善或维护服务和基础设施，如人行道、交通管理、景观改善、排水、排污和其他公共设施。对于那些不想建造高层建筑的开发商，他们可以出售空中权。计划的其他条款包括鼓励分区、包容性发展、智能发展、新城市建设，公私合营，洪水覆盖区，跨领域方式和三大基本方式。

在Palafox Associates与Skidmore以及SOM为洛克菲勒中心进行建筑设计和总体规划时，马卡蒂市的高级综合开发宗地的售价为每平方米8,000比索 (1,392港币)。如今，洛克菲勒中心的土地售价为每平方米200,000比索 (34,799港币)。

在社会包容性方面，无法负担起住房以及收入差距迫使穷人和主要劳动力远离都市，花费长达三个小时的时间去上班。这一现象随着城市机动的现状正逐恶化，只有不到20%的人在马尼拉使用汽车 (全国2%)，然而交通运输政策和项目都赞成使用汽车。为了解决这些问题，在城内政府中心的对面建造了可供主要劳动力购买的中层住宅 (要求由40%的开放空间)。非正式移民对包容性分区和适应性建筑概念的意识增强也激发了他们的环保意识。

从容积率中额外获得的建设面积可用于防洪设计。圣胡安市的平均容积率为0.5-1，这意味着大部分建筑为1-3层，是由郊区化所致的典型住宅。容积率将根据道路的承载能力按面积确认 (道路宽度与人口成正比)，鼓励设施和使用的兼容性，并控制建筑密度。不同的用地性质对地块或基地有不同的使用比例：住宅为50%-80%，商业为70%-90%，机构为60%。基地情况不同也会产生差异，如基地设计或地块重新组合，建筑设计及区域历史问题。(见图5)

圣胡安市内的大部分地块采用了60%的基地占有率 (PLO)。剩余的40%作为绿色开放空间，公用设施和基础设施，人行道以及服务道路。

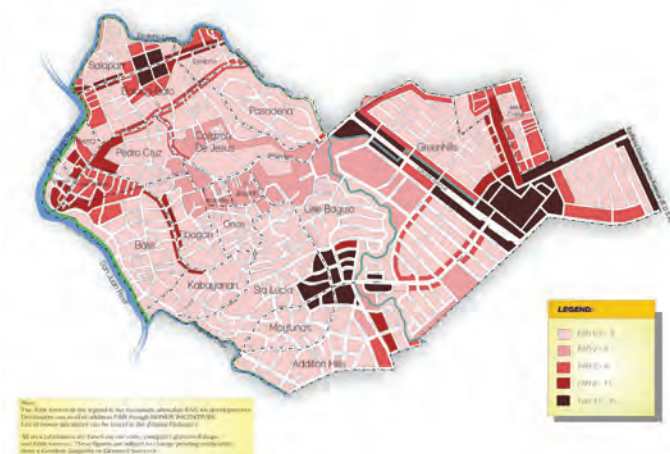


Figure 5. This Floor Area Ratio (FAR) map of San Juan shows the maximum allowable FAR for developments. Growth nodes are provided compatible for designations based on the chosen framework. (Source: San Juan Comprehensive Land Use Plan and Zoning Ordinance, 2013-2023)

图5. 这张体现圣胡安容积率的地图显示了开发允许的最大容积率。根据所选框架的指示提供相兼容的增长节点 (来源: 圣胡安综合土地利用计划和分区条例, 2013-2023)

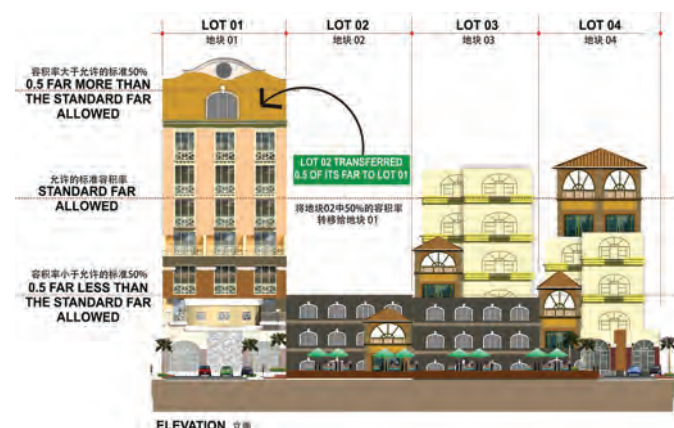


Figure 6. Illustrating the transfer of development rights based on the allowable FAR in San Juan. Benefits are gained through the trade of air rights that will be posted on the city website. (Source: Palafox Associates Library)

图6. 根据圣胡安允许的容积率说明转移开发权。通过空中权贸易获得的收益将被公布在市官方网站上。(来源: Palafox Associates图书资料)

BERDE LEVEL	FAR BONUS
One Star	0.50
Two Star	1.00
Three Star	1.50
Four Star	2.00
Five Star	2.50

LEED LEVEL	FAR BONUS
Certified	0.50
Silver	1.25
Gold	2.00
Platinum	2.50

Table 2. Green Building Density Incentives, certified by the PHILGBC Building for Ecologically Responsive Design Excellence (BERDE) or the US Leadership in Energy and Environmental Design (LEED) rating system. (Source: San Juan Comprehensive Land Use Plan and Zoning Ordinance, 2013-2023)

表2. 绿色建筑密度奖励措施，经BERDE和美国LEED评级系统认证。(来源:圣胡安综合土地使用计划和分区条例,2013-2023)

another lot (development lot). This can improve the density of the priority areas, reducing the need to build on undeveloped land. It will also improve the city's economy as a beneficial trade occurs between the buyer and seller of Air Rights.

Additional FAR beyond the prescribed allowable maximum FAR can be applied for the following development modes subject to the requirement of the Implementing Rules and Regulations (IRR). In all commercial zones, a building or a structure within a four hundred (400) meter walking distance from an existing transit station will be allowed to build three (3) FAR higher than their maximum FAR specified in the Zoning Ordinance, provided that the building owner/s or developer/s should build and maintain, at their cost, an elevated walkway at the same level as the terminal. It should have well-ventilated, sheltered pedestrian links from their buildings to the immediate transit station / terminal structures as approved by the Building Official and in consultation with concerned transit authorities. This link must be of sufficient dimension to accommodate public pedestrian volumes, accessible PWDs and elderly, have directional clarity, must be one meter above the flood protection elevation, and must be kept open, safe, and well-lighted for the use of the general public at least during a period that extends before and after regular working hours.

As far as FAR bonuses are concerned, provision for Green Building Density Incentives will be provided to buildings that will be certified by the PHILGBC Building for Ecologically Responsive Design Excellence (BERDE) or the US Leadership in Energy and Environmental Design (LEED) rating system (see Table 2). BERDE is initiated by the Philippine Green Building Council and is more adapted to local needs, while LEED is administered by the US Green Building Council.

Furthermore, developments of Mixed-Use character shall have a 70/30 sharing of uses. Where 70% of the development must be of the principal use and the other 30% can be of any of the allowed uses within the zone category.

To promote and encourage a safe and secure public realm, walls and gates surrounding the perimeter of the lot, whether constructed or naturally grown, must have the maximum height limit of one (1) meter above the natural grade of the lot (see Figure 7), while backyards must have a maximum of 1.8 meters. In cases where the need for fencing beyond the standard is justifiable, fencing above the height limit shall be made of at least 80% see-through fence such as but not limited to wrought iron fences, chain link fences, picket fences, among others. To encourage the flow of runoff water and avoid stagnant water pooling, front yard fences should be porous or have drip holes.



Figure 7. Maximum Height Limit of Fence for the front and side yards. Low walls are proposed to provide more eyes on the road, improving security within the city. (Source: San Juan Comprehensive Land Use Plan and Zoning Ordinance, 2013-2023)

图7. 栅栏和围栏的最大限高。建议低墙周边的路上安装更多的监视器，提升城市安全性。(来源:圣胡安综合土地使用计划和分区条例,2013-2023)

目前中等密度住宅区的建筑限高是21米，低密度商业区的建筑限高是10米。因为有分配的容积率，建筑不再有高度限制。容积率奖励政策适用于所有为公众利益提供公共设施的开发商。

在圣胡安《综合土地利用规划和分区条例》中，需要考虑的另一方面是开发权的转移。转移开发权可通过空中权买卖双方互惠互惠的贸易来提升经济。(图6)

按照容积率体现转移开发权和发展空间，可从一个地块(转移地块)转移到另一个地块(开发地块)。这将提高优先级区域的密度，减少未开发土地的建设需求。同时，由于空中权买卖双方互惠互惠的贸易往来，这也提高了城市的经济效益。

超出规定最大容积率的部分可根据实施细则和条例(IRR)的要求应用于以下开发模式。在所有商业区内，一个建筑或结构距离现有换乘站400米步行距离以内的，允许建立超出分区规范最大规定容积率3的建筑，前提是建筑持有者或开发商愿意花成本建设和维护位于同一水平面上的高架人行通道。其应保持良好的通风，经建筑官方部门和运输部门批准，行人从大厦通往最近的换乘站之间的通道连接应有外壳防护。通道需有足够的尺寸安置行人通过，需设残疾人和老年人专用通道，指示清晰，通道必须高于防洪水平线1米以上，在正常工作时间前后延长期间，应至少对公众保持开放、安全和明亮。

就容积率奖励而言，需要进行BERDE认证或美国LEED认证的建筑都将按照绿色建筑密度奖励规定。(见表2) BERDE 是由菲律宾绿色建筑委员会发起的，更适应当地的需求，而LEED由美国绿色建筑委员会管理。

此外，综合开发项目应享有70/30的使用权。70%的开发内容作为主要用途，剩下30%可以是区域类别中允许的任何使用功能。

为促进和鼓励一个安全可靠的公共领域，地块周边的围墙和大门，无论是人工或自然生长，最多高于地块自然高度一米(见图7)，而后院最多高于地块自然高度1.8米。在需要栅栏的情况下，超出标准是合理的。超出限高部分的栅栏应确保至少有80%可见度，包括但不限于铁栅栏，锁链栅栏，尖桩篱笆栅栏和其他。为了促进活水流动，避免造成积水和水池，前院栅栏应该是多孔或滴孔状。

城市灾害策略

极端气候在菲律宾已从必然性转化为现实。这种无常的气候变化甚至已在像圣胡安市这样的小城市里显示出其特征。因此，预防胜于治疗才是明智之举，它促使城市寻求创新和方法以减少气候变化影响所带来的风险。而土地利用计划的制定受法律制

City Disaster-Proof Strategies

Extreme climatic occurrences in the Philippines have turned from inevitability into reality. Such irregular climate variations have already shown its symptoms even to small cities like San Juan. Thus, the wisdom of the greater weight in prevention over the cure has prompted the city to look into innovations and means to decrease the risk of climate change impacts. While the formulation of land use plans are mandated by law, Palafox Associates did not just see this only as a given, but as a chance to work with a city government that would be able to seriously materialize and put sound environmental strategies to work.

Almost one-third of the population of San Juan are informal settlers, and majority of the population living in San Juan are not permanent residents of the city. Because of San Juan's rapid and uncontrolled development, it contributed to extreme lack of open spaces, while some areas had poorly designed and inadequate sidewalks for pedestrians. Moreover, neglect throughout the years resulted in extremely polluted creek tributaries due to the presence of large numbers of informal settler families and garbage from neighboring cities upstream outside of San Juan. Inadequate drainage and sewer systems resulted in neck-deep flooding, a pressing issue that surfaced after last month's heavy rains and typhoons.

Thus, unique in the plan was the integration and localization of disaster risk preparedness as a continuous consideration in all aspects, whether it be in macroscale city-wide levels, microscale priority development sites, and regulatory policies. Without the integration of climate-adaptive strategies, the city would not be living up to its vision of a city of excellence while its residents would live a daily routine of risk and threats. It was through the planning process that laid the guiding post not just for development but also the embodiment of disaster-proof principles; such would prepare its residents for changes in the climate that are not easily controlled.

The plan called for a 100-year flood level study (see Figure 8), and structures intended for human occupancy must be higher than three feet (1 meter) above flood protection elevation (see Figure 9) while utility facilities like electrical equipment, water service, and sanitary sewer connections shall be equal to or higher than the flood protection and shall be flood-proofed.

Instrumental Changes Take Shape

Shifts and transformations have begun to shape the city such as the fostering and empowerment of local communities, a changed outlook of public officials and stakeholders to provide resources and support, and the promotion of public-private partnerships towards long-term solutions that were a result of the collective vision from the workshops and consultations.

Some of the provisions of the 2013-2023 San Juan CLUPZO, approved by the San Juan city government and city council has been set into motion even before its adoption and approval last September 16, 2013. One of the significant city ordinances that have been passed in support of the CLUPZO is providing planning, development, construction, and financial assistance to the city's socialized housing projects for the benefit of the informal (and formal) settlers of San Juan. Another significant ordinance passed last year is requiring all vehicles to stop before traversing a pedestrian lane with people crossing and providing penalties for subsequent violators has been helping instill discipline and promote pedestrianization to the citizens.

约, Palafox Associates不仅把这看作是一种给予,而是将它视为与市政府合作的机会,认证落实环境策略。

几乎三分之一的圣胡安人口是非正式移民,大部分居住在圣胡安市的人为非永久居民。由于圣胡安快速和无节制的开发,造成了极度缺乏的开放空间,一些地区被设计的非常糟糕,人行道布置极不合理。然而,多年来的管理疏忽造就河流支流的严重污染,这都源于大量非正式移民家庭的存在和来自河流上游邻近城市的生活垃圾。不恰当的排水和污水处理系统导致洪水泛滥,漫过人的脖子。上个月的暴雨和台风后,一个迫切的问题浮出水面。

因此,计划的独特之处是整合和定位灾害风险防范,对其进行全方位的不间断思考,无论是在宏观尺度的城市范围,或是在微观优先开发用地和调控政策中。没有了气候适应性策略的整合,城市将不可能展现如此风貌,居民将生活在风险和威胁之中。规划过程不但奠定了开发的指导方针,还体现了抗灾原则,这样使居民不易受气候变化的控制。

该计划被称作是百年一遇洪水水位研究(见图8),适宜人类居住的结构必须高于防洪标高三英尺(1米),同时公用设施等电器设备,供水和下水道连接应等于或高于洪水防护线且具备防洪能力。(见图9)

重要转变的成型

转变和转换已开始逐渐塑造整个城市,如本地社区的培养和营建,公共官员和利益相关者改变了以往的看法开始为城市建设提供资源和帮助,以及将讨论会和咨询会的共同设想结论——促进公私合作,作为长期解决方案。

圣胡安《综合土地利用规划和分区条例2013-2023》的部分规定,经圣胡安市政府和议会批准,在2013年6月采用和批准前已被实施。其中重要的城市条例已通过并支持《综合土地利用规划和分区条例》,为城市的正式和非正式移民而建的社会住房项目提供了规划、开发、建设和经济援助。去年通过的另外一条重要条例



Figure 8. To mitigate and reduce the risk to disasters, overlay maps are used to identify disaster prone areas within the city. This is the Flood Hazard Map of San Juan City, featuring its most flood-prone areas highlighted in orange. Most of these areas are situated beside the San Juan River and creeks (Source: San Juan Comprehensive Land Use Plan and Zoning Ordinance, 2013-2023)

图8.为了减轻和减少自然灾害的风险,覆盖图将被用来识别市内的灾害易发区。这是圣胡安市洪水风险图,橙色部分为最易发生洪水的区域,大部分位于圣胡安河及其支流的边缘。(来源:圣胡安综合土地使用计划和分区条例,2013-2023)

The 2013-2023 Comprehensive Land Use Plan and Zoning Ordinance (CLUPZO) of the City of San Juan will be instrumental in making the stakeholders' vision a reality, and exemplify the struggle of creating a more livable city that imbibes the green consciousness for the greater good of all, a city and community that's environment-friendly, better connected, more accessible, more walkable, safer, better lighted, more convenient, and cleaner for mixed income and cross-generational residents, where they can have places to live, work, shop, dine, learn, and worship, backed by high quality facilities and activity centers.

要求行人穿马路横穿路时，所有车辆必须停在停车线内，并对违规者进行处罚。这一条例帮助灌输了纪律，改善了市民的步行区。

圣胡安《综合土地使用计划和分区条例,2013-2023》(CLUPZO) 帮助利益相关者将设想变成现实，努力创建一个更宜居的城市，结合环保意识获得更多的利益，使城市和社区变的更加环保，具有良好的连接性和可达性，更适宜步行，更安全，有良好的照明，更方便和干净。通过高品质设施和活动中心为居民创造生活、工作、购物、用餐、学习和礼拜的场所。



Figure 9. Proposed linear parks using the required 3 meter easements of all creeks passing through the city with additional provisions for flood protection. (Source: San Juan Comprehensive Land Use Plan and Zoning Ordinance, 2013-2023)

图9. 建议带状公园，所有经过城市的支流都要求有3米缓冲带作为防洪的附加措施。。(来源:圣胡安综合土地使用计划和分区条例,2013-2023)

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