District 3 Youth Commissioner: Nicole V. Hoang
November 27, 2019
A Policy for the Utilization of Sustainable Architecture in San José

Policy Team: Environment
Discussion Area: Policy

Section 1.0 - Definitions

Large scale construction projects/large scale building projects - any construction of any building containing 50 or more units, which may be spread across multiple buildings (general context).

High-rise buildings - every building of any type of construction or occupancy having floors used for human occupancy located more than 75 feet above the lowest floor level having building access (San José's definition).

Green architecture/sustainable architecture - architecture that has a healthful interior environment, has resource efficiency, utilizes ecologically benign materials, is built in an environmental form, and has good design—meaning the green/sustainable architecture will yield a good overall result on the surrounding environment (Definition by the United Nations).

Section 1.1 - Recommendation

Section 1.11

Sustainable architecture will be utilized in all future high-rise buildings in order to preserve our environment.

Section 1.12

Sustainable architecture will also be utilized in all future large-scale construction projects in order to preserve our environment.

Section 1.2 - Impacts

Section 1.21

Through large amounts of research from internationally-accredited sources, it has been found that the environment can be largely impacted negatively by high-rise buildings and large scale construction projects in varying ways, including a change in wind currents, the formation of dangerous "heat islands", and air pollution. Furthermore, it has been predicted by numerous sources that sustainable architecture can mediate the environmental ramifications of high-rise buildings as well as large scale construction projects/sites. Thus, for the interest of our environment, this bill should be passed.

Section 1.22

Through research, it has been found that public health may be negatively impacted by the formation of high-rise buildings and large-scale construction sites through air pollutants, which may trigger asthma or other lung diseases in our citizens.

However, workers in buildings utilizing sustainable architecture show higher cognitive scores on brain function, more productivity, and longer lengths in sleep. Thus, to preserve the health of our citizens, it is vital that we approve this bill.

Section 1.23

Economically, sustainable architecture is able to help builders as well as citizens. It has been shown that sustainable architecture reduces the amount of money the operators of the building have to use on energy and water, while also giving owners an increased asset value by seven-percent compared to traditional buildings which don't utilize sustainable architecture. Thus, this bill's passing will also reap economic rewards for both the city and the structure owner and manufacturer.

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I. Recommendation

High rise buildings, along with large scale construction projects, should be required to utilize "green architecture" (also known as sustainable architecture) in their building designs in order to help build a more environmentally sustainable City of San José.

II. Background

With San José's rapidly growing population, we are facing a problem many other large cities face: a lack of building space. In response, San José's natural next step is to utilize more high rise buildings along with large construction projects in order to optimize housing along with business construction. According to ScienceDirect, "With land becoming scarce and expensive, particularly in big cities, developers and builders have no alternative but to build up and consequently high rise buildings are beginning to appear in large numbers". Furthermore, according to a paper written by Botir and Irina Giyasov, respectively from Moscow State University of Civil Engineering and Tambov State Technical University, "Urban development as a combination of complex architectural forms significantly affects the aerodynamics of the terrain. In this regard, both industrial areas and high-density residential areas are environmentally unfavorable. Thus, high-rise buildings and structures, being an integral part of a modern city, significantly aggravate the environmental conditions of urban areas".

However, currently, there is a term growing in both the design world and architecture world. Sustainable architecture is steadily growing more popular as concern for the environment becomes more publicized. Sustainable architecture is architecture meant to minimize its effects on the environment. Such examples of this would include minimizing energy usage, along with the utilization of renewed or recycled building materials. The United Nations defines sustainable architecture as architecture that has a healthful interior environment, has resource efficiency, utilizes ecologically benign materials, is built in an environmental form, and has good design—meaning the green/sustainable architecture will yield a good overall result on the surrounding environment.

Sustainable architecture is of large importance for the City of San José. In our quickly changing climate, sustainable architecture is needed for our city to be long-lasting. Our youth have already expressed extreme interest in keeping our city environmentally-friendly, as seen in the climate strike and its extremely large turnout with our youth in it. Furthermore, in the Youth Summit which took place on January 11, 2020, the environment was placed in the top ten budget priorities for youth. Thus, it is extremely clear our youth have the environment as one of their top priorities for the city, which is why we should consider sustainable architecture as a requirement.

III. Research

Currently, if we do not utilize sustainable architecture, many downfalls will come to our city—some of which are already here. All of these downfalls will badly affect our city in the future. One example of this can be seen in air quality, as according to Botir and Irina Giyasov, "The natural wind regime in public residential areas of a modern city is affected by high density of high-rise buildings, and the air has a higher concentration of pollutants due to lack of air exchange. Getting into the lungs of urban residents together with the inhaled air, pollutants modify gas exchange and cause oxygen starvation, thereby causing asthma or its aggravation and other lung diseases". Our citizens' health will be badly affected if we do not consider the architecture we are using. Furthermore, they continue to state how each high-rise building will make "heat islands" as the accumulation of heat will be multiplied in warmer seasons.

According to National Geographic, "in [urbanized] cities[,] two of the most pressing problems facing the world today also come together: poverty and environmental degradation". Furthermore, "Poor air and water quality, insufficient water availability, waste-disposal problems, and high energy consumption are exacerbated by the increasing population density and demands of urban environments. Strong city planning will be essential in managing these and other difficulties as the world's urban areas swell."

Another paper supports the claim that high-rise buildings have negative impacts on the surrounding environment. According to H. Hayati and M.H. Sayadi from the Environment and Civil Engineering Department at the University of Birjand, Birjand, Iran, "the negative [effects] in the environment [from high rise buildings] create new problems including increasing congestion population, environmental pollution, [and reducing] citizen access to fresh air and sunlight. However, regarding [population increase] and land shortage, tall buildings could not be avoided". Additionally, "...tall buildings cause increasing the air pollution in large urban [areas] due to changing in [the] wind and its direction[,]... congestion of tall buildings [are also] pollution sources. Therefore some techniques to design the tall building[s] must be considered to reduce the negative [effects] of the tall buildings on environmental pollution."

In the same paper, an aspect of green architecture is expressed as a positive concept. "Experts believe that the role of vertical green spaces [plants] improve the urban landscape as well as [reduce] air pollution and noise pollution. Sharghi and Mohtashami reported that more than 800 roofs with green space[s] [have] been counted in Germany and used as a field production of vegetables and edible fruits. Roof gardens help absorb heat and cause lower... temperature[s] in summer and higher temperature[s] in winter inside the building, consequently reducing the energy [usage]. In addition[,] plants can balance temperature and humidity...[they

are] also able to absorb toxic gases... and remove 20 mg of ammonia in the air". From this, we can conclude that the role of green architecture in the form of vertical green spaces is indispensable as they release oxygen, optimize environmental conditions, and optimize energy usage for the building.

Overall, there are many benefits to sustainable architecture, all of which will improve our city both now and in the future. According to Amany Ragheb, Hisham El-Shimy and Ghada Ragheb, respectively from the Department of Architectural Engineering, Delta University for Science and Technology, Mansoura, Egypt, and the Department of Architectural Engineering, Pharos University, Alexandria 21311, Egypt, "It [sustainable architecture] is of vital importance to all because it deals with the survival of [the] human species and almost every living creature on the planet...At the rate the development needs of this world is using the scarce and limited resources found on the earth, it is becoming obvious that unless there are major changes to Man's thinking and behavior, the future of civilization as known today is dubious... Environmentally, green architecture helps reduce pollution, conserve natural resources and prevent environmental degradation. Economically, it reduces the amount of money that the building's operators have to spend on water and energy and improves the productivity of those using the facility (Thomas, 2009)[.] And, socially, green buildings are meant to be beautiful and cause only minimal strain on the local infrastructure".

According to the World Green Building Council, there is a plethora of benefits to green architecture.

"At a global level:

- The building sector has the largest potential for significantly reducing greenhouse gas emissions compared to other major emitting sectors – UNEP, 2009.
- This emissions savings potential is said to be as much as 84 gigatonnes of CO2 (GtCO2) by 2050, through direct measures in buildings such as energy efficiency, fuel switching and the use of renewable energy – UNEP, 2016.
- The building sector has the potential to make energy savings of 50% or more in 2050, in support of limiting global temperature rises to 2°C (above pre-industrial levels) – UNEP, 2016.

At a building level:

- Green buildings achieving the Green Star certification in Australia have been shown to produce 62% fewer greenhouse gas emissions than average Australian

buildings, and 51% less potable water than if they had been built to meet minimum industry requirements.

- Green buildings certified by the Indian Green Building Council (IGBC) results in energy savings of 40 - 50% and water savings of 20 - 30% compared to conventional buildings in India.
- Green buildings achieving the Green Star certification in South Africa have been shown to save on average between 30 - 40% energy and carbon emissions every year, and between 20 - 30% potable water every year, when compared to the industry norm.
- Green buildings achieving the LEED certification in the US and other countries have been shown to consume 25 per cent less energy and 11 per cent less water, than non-green buildings.

Green buildings offer a number of economic or financial benefits, which are relevant to a range of different people or groups of people. These include cost savings on utility bills for tenants or households (through energy and water efficiency); lower construction costs and higher property value for building developers; increased occupancy rates or operating costs for building owners; and job creation. Since the publication of WorldGBC's groundbreaking 2013 report, *The Business Case for Green Building*, we have sought to strengthen the link between green buildings and the economic benefits they can offer.

At a global level:

- Global energy efficiency measures could save an estimated €280 to €410 billion in savings on energy spending (and the equivalent to almost double the annual electricity consumption of the United States) – European Commission, 2015.

At a country level:

- Canada's green building industry generated $23.45 billion in GDP and represented nearly 300,000 full-time jobs in 2014 – Canada Green Building Council / The Delphi Group, 2016.
- Green building is projected to account for more than 3.3 million U.S. jobs by 2018 – US Green Building Council / Booz Allen Hamilton, 2015.

At a building level:

- Building owners report that green buildings - whether new or renovated - command a 7 per cent increase in asset value over traditional buildings – Dodge Data & Analytics, 2016.

Green building benefits go beyond economics and the environment, and have been shown to bring positive social impacts too. Many of these benefits are around the health and wellbeing of people who work in green offices or live in green homes.

- Workers in green, well-ventilated offices record a 101 per cent increase in cognitive scores (brain function) - Harvard T.H. Chan School of Public Health / Syracuse University Center of Excellence / SUNY Upstate Medical School, 2015.
- Employees in offices with windows slept an average of 46 minutes more per night - American Academy of Sleep Medicine, 2013.
- Research suggests that better indoor air quality (low concentrations of CO2 and pollutants, and high ventilation rates) can lead to improvements in performance of up to 8 per cent–Park and Yoon, 2011."

IV. Advantages

As the research section has provided, there is boundless number for our city if we, along with other companies and builders, begin to utilize more green architecture in our high-rise buildings and large-scale construction projects. Sustainable architecture helps maintain the environment, as well as minimize any negative effects the buildings have. A decreased amount

of carbon emissions, a more energy-efficient city, and a better urban environment are all things we can look forward to by implementing this bill.

V. Solvency

Through implementing this bill and making sustainable architecture a requirement for all high-rise buildings and large-scale construction projects in the City of San José, we will be minimizing our negative effects on the environment, improving the quality of life of all of our citizens, helping our own economy, and making a more sustainable city for all future generations to come.

VI. Potential Setbacks

One potential setback of making sustainable architecture a requirement is that large builders may be a bit reluctant to build in San José. However, it has been shown that sustainable architecture actually is an incentive to builders and investors in cities due to the fact that sustainable architecture gives the building owner a 7% increase in property value, as well as allows them to save money on water and electricity bills. Furthermore, companies are incentivised as their employees will actually enjoy a better overall health, and improved cognitive ability, thus giving employers and company managers clear advantages for utilizing sustainable architecture.

VII. Closing Statement

The San José Youth Commission is in strong support of this bill requiring high-rise buildings and large-scale construction projects to utilize sustainable architecture in order to preserve our environment for the future. We recognize that though there may be a small potential for a tiny economic setback, the environment is a larger issue which outweighs this setback, and thus must be addressed immediately for the sake of the future of all citizens of San José.

VIII. Collaborated With

Collaborated with the San José Youth Commissioners, the District 3 Youth Advisory Council, and general youth.

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