Overview

Welcome to the 541-year-old city of Teratai, meaning *lotus* in Indonesian. This tropical island metropolis lies north of the Ciliwung River and borders the Java Sea. Measuring 800 square kilometers, this capital of Indonesia houses 39 million people. Due to its world-renowned public spaces, Teratai received the 2160 *Mercer’s Best City to Live In* award. Teratai’s robust economy produces and exports metals, machinery, high-tech goods and surplus energy.

Teratai was not always the example of excellence it is today. It was once Jakarta, which possessed abysmal traffic and severe flooding. *Time Magazine* rated it as the world’s worst designed city. Disaster struck in 2060 when the Sunda and Indo-Australian plates collided, causing devastating tsunamis and earthquakes. City and business leaders of Jakarta cooperated with the UN to revitalize the municipality and renamed it Teratai, representing purity and rebirth in Indonesian culture.

Infrastructure

Some of the most pressing challenges that Jakarta faced include congested traffic, air pollution, fossil fuel-based energy consumption, and inefficient agricultural practices. Today, Teratai’s infrastructure systems act as a model for other nations. Civil engineers created a highly integrated and accessible transportation system, named Langit Melatih, based on electrodynamic magnetic levitation that meets citywide (CLM), domestic (DLM), and inter-continental (ICLM) travel needs while eliminating the need for personal vehicles. Teratai converted most of the greyfields created by obsolete roadways to walking and biking paths, boosting the health of citizens.
Nuclear, electrical, mechanical, and material engineers innovated Teratai’s power sources. The majority of energy comes from nuclear fusion, which involves fusing the hydrogen isotopes, deuterium and tritium, to form helium-3. To create energy diversity, Teratai produces solar power. Teratai’s structures use solar surfing, while windows are comprised of transparent solar panels. To increase production in the rainy climate, solar panels harness energy during rain by placing a one atom thick layer of graphene separating ammonium, calcium, and sodium ions from precipitation. Ions clinging to electrons in graphene form a dual-layer pseudo-capacitor which produces energy from the concentration gradient created. A hydroelectric dam built into the base of the lotus-shaped Culture and History Museum provides additional energy.

Climate change made Jakarta’s farms impractical. Agricultural, structural, and architectural engineers collaborated to create a system of vertical farms, increasing crop variety and yield. Sensors line the walls of the vertical farms to control climate and identify and quarantine disease. Robotic harvesting and distribution moves fresh produce to points throughout the city.

**City Services**

Educating children is one of Teratai’s greatest priorities, which is why two of its most innovative tools include the Immersive Interactive Environments (IIE) and Artificial Intelligence Modules (AIM). IIE creates virtual representations of lessons, allowing students to learn by experiencing the event or process first-hand. AIMs serve as personal tutors by constantly adjusting to each student’s level of need.

Formerly, Jakarta faced significant health concerns including malnutrition, pollution-induced asthma, and infectious diseases. In contrast, Teratai utilizes state-of-the-art medical
facilities and public health programs. Using bioscans provided by nanorobots, doctors can monitor patient health and status. Our biotech leaders are also known for their work in immunotherapy and advances in telemedicine, connecting doctors with their international colleagues to provide patients with cutting-edge treatments.

Citizens are safe in Teratai. Our Specialized Emergency Detection Systems, built into the infrastructure of the city, detect fires and immediately dispatch drone firefighting units. Citizens can summon interactive holographic paramedic support through their personal communication devices, which operate through quantum entanglement, providing immediate assistance.

**Brownfield to Public Space**

In 2017, the Ciliwung River was one of the most heavily polluted rivers in the world; today it is the centerpiece of a bustling riverwalk. To mitigate the pollution, Teratai implemented a system of sensors that detect and filter pollutants and send aquatic drones to gather larger debris. The city also utilized synthetic bacteria to efficiently dispose of chemical waste. Teratai also educates citizens about proper waste disposal.
On the banks of the river, the city planted a variety of vegetation and native Indonesian trees to provide shade and reduce erosion. We genetically engineered a mycorrhizae fungi forming a symbiotic relationship with plants to maximize the water and absorption rates in the nutrient-poor soil. Genetically engineered bioluminescent bacteria run in tubes along the water, further reducing Teratai’s carbon footprint. These bacteria consume the pollutants filtered from the river. Using different enzymatic reactions, we can control light intensity and color production in the bacteria. Traditional Indonesian foods and cultural performances are enjoyed in the open-air buildings surrounding the riverwalk. Today, the Ciliwung River is one of the most visited public spaces on the planet.
**Roadway to Public Space**

In 2017, Jakarta was without sufficient public spaces for its burgeoning population. After the 2060 disaster, Teratai’s Public Space Administration collaborated with civil engineers and urban planners to transform the Jakarta Beltway, which formed a 138 kilometer loop around the city, into an expansive interactive park called Jalan Raya Park (JRP). Used as a daily refuge from the metropolis, JRP applies reactive reality technology to create an interactive tactile experience. Reactive reality is an advanced cerebral input system where citizens have the ability to interact with others in a variety of terrestrial settings. The JRP is connected to Central Lorong and Muara Angke, two revitalized Jakartan slums, by the DLM. There are six automated entry points located along JRP. These distribute biodegradable reactive reality patches, which are placed behind the ear. These patches create an endless number of Virtual Interactive Biomes (VIBs) which simulate a variety of weather conditions and terrains. Biomedical, electrical, and computer engineers collaborated to develop this patch.

Through VIBs, experiences range from thrilling workouts such as cycling in the Alps or climbing Kilimanjaro, to relaxing biomes where citizens can go fishing with their friends or read a book on the beach. Not only is JRP a place where people can visit other biomes, it is also a beautiful park filled with native flora and fauna. If citizens want to “unplug” (take off their patch), they can enjoy walking and biking trails on the inner loop. Citizens use hover walkways to access different areas of JRP once they enter the park. Electrical engineers designed shoe insoles that utilize electrodynamic magnetic levitation technology and allow citizens to move quickly from one part of the park to another via the hover walkway. Creating a robust income for Teratai, JRP has become a popular tourist attraction and venue for hosting international sporting
events like the upcoming 2168 Olympic Games. City leaders have committed at least 20% of JRP’s revenue for maintaining and upgrading our public spaces.
Network of Public Spaces

The water lotus root visually inspired Teratai’s compact, walkable, and transit-oriented city plan, L.O.T.U.S. (Link of Trans-Communal Urban Systems). The system utilizes hundreds of L.O.T.U.S. cells, each containing three residential circles with a 1.5 km radius and 24 public spaces with a transportation hub centrally-located. Commercial space buffers the area between residential and industrial zones in standard L.O.T.U.S. cells, whereas mixed-use residential/commercial zones are found in high density cells.
Old Jakarta constantly battled flooding. To address this development challenge, Teratai’s urban planners incorporated pocket parks, which apply the concept of bioretention in a system of bioswale rain gardens. Bioretention involves a slight depression in the ground filled with deep-rooted native plants which soak up stormwater runoff, thereby preventing flooding and cleaning water of pollutants. These parks highlight Indonesian culture through art depicting local folktales and native plants such as the Kelapa Tree, Melati Putih, and the Moon Orchid. Sociologists have
found that improvements of our public spaces have provided opportunities for our diverse population to interact and the happiness and health of citizens have vastly improved.

**Benefits, Tradeoffs, and Compromises**

The cost of rebuilding Teratai was tremendous. The UN Fund for a Sustainable Future remunerated initial investments while tariffs on our high-tech exports and profits from JRP paid for additional redevelopment costs. Civil engineers, in conjunction with material and structural engineers, created LEED Platinum certified structures that can sustain the environmental catastrophe that devastated Jakarta. The urban planners’ conscientious place-making also added several benefits, including increased property values, improved environment, enhanced public health, and well-attended cultural events. City Leaders placed industrial zones further from residential areas, increasing the commute for workers. The tradeoff increased the quantity and quality of public spaces in residential areas.

**Conclusion**

Crafted by urban planners, architects, and engineers, Teratai has struck the perfect balance between urban convenience and nature-rich public spaces. With cutting-edge technology and transportation, unrivaled agriculture and education, and ground-breaking public spaces, our citizens are delighted to live in the crown jewel of Oceania.

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Works Cited


