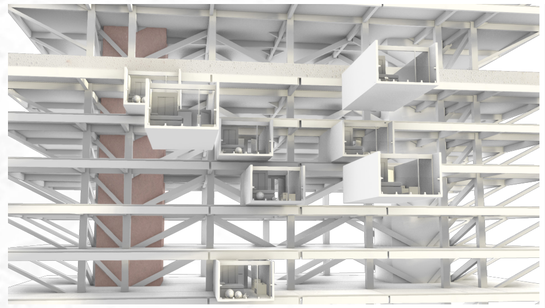
[UN]PLUG

An adaptive re-use of a parking structure for affordable housing in downtown San Diego

[UN]PLUG includes a residential tower in which modular units can be placed into the structure and removed and reconfigured as the needs of residents change over time. The incorporation of a desalination component allows for clean water to supply the building, generate energy with the use of solar heating, evaporative cooling, and ventilation to exhaust heat from each unit allows for the building to operate without a connection to city power grid or water supply.

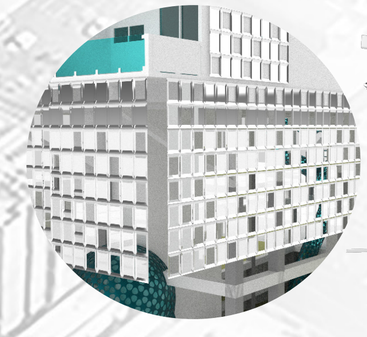
VMT (vehicle miles traveled) as a metric was the driving force behind creating an environment which mitigates the use of automobiles by streamlining conditions for autonomous drone delivery services for individual residences. In order to fuse the condition of autonomous drone delivery services and architecture, a grasshopper definition was developed and adapted as a prototype for future implementation of geographical conditions as a coding mechanism for drones to create autonomous conditions. The grasshopper definition effectively reduces man-piloted drone requirements and operates through OSM data as a mechanism in conjunction with GPS telemetry, it is applicable for any condition in which OSM demographics are feasible. The definition effectively provides a condition which significantly reduces vehicle miles traveled for daily consumption needs and subsequently reduces the carbon footprint produced from residents in large-density conditions.

Typical modular units, ranging from 275 SF studio to 580 SF 2 bedroom units.



Skyscraper structural system was designed entirely to incorporate modular units. Every modular unit was designed with balcony access to allow the integration of drone package delivery services in conjunction with future potential density transformation by adding and subtracting of modules within skyscraper.

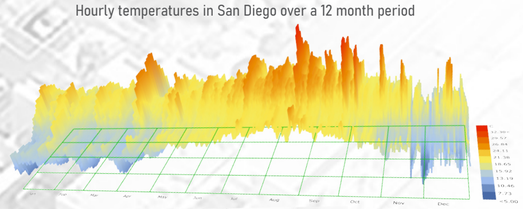
Proposed tower over parking garage

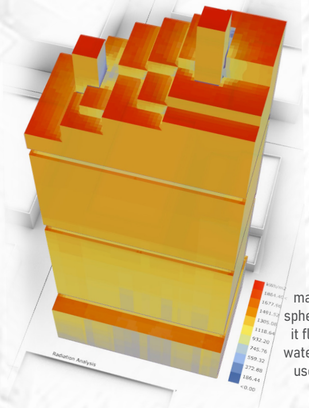


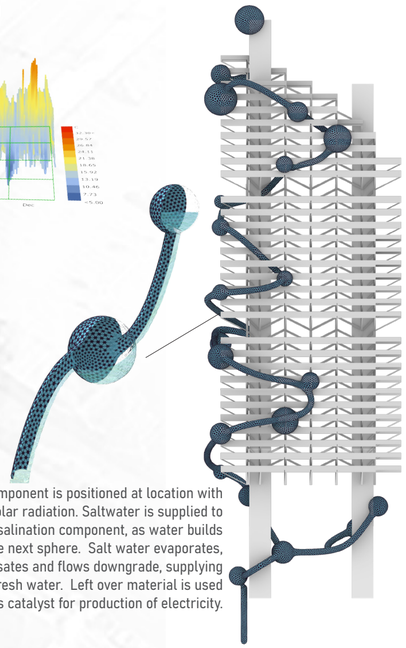
Exterior skin is coated with titanium dioxide in areas exposed to direct sunlight. The subsequent interaction of UV light and TiO^2 aids in neutralizing pollutants created by vehicles on the busy streets of downtown San Diego, giving this building the opportunity to leave a carbon-negative footprint.

Functionality alongside the consideration for natural ventilation was a driving factor for modular units. Programmatic design efforts were centered at balconies to allow maximum penetration of light for interior spaces for healthy living. Typical construction methods were adopted in modular units to incentivize mass adoption and economic feasibility.

Hourly temperatures in San Diego over a 12 month period







Desal component is positioned at location with maximum solar radiation. Saltwater is supplied to spheres of desalination component, as water builds it flows to the next sphere. Salt water evaporates, water condensates and flows downgrade, supplying users with fresh water. Left over material is used as catalyst for production of electricity.

Subsequent increase/decrease of density creates spaces within spaces manipulated by users.

Residential density is proposed as a dynamic characteristic of program in which modular plug-ins allow for infinite number of configurations contingent on user needs.

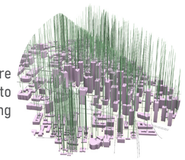
Existing parking garage structure

Underutilized parking garage structure was repurposed to accommodate residential modular units. Void was created at center to allow natural light and air to penetrate through proposed atrium. Structural system of skyscraper was designed within atrium with stair and elevator access at center of program. Resulting floor plates allow open spaces around perimeter allowing plug-in modules to incorporate within building envelope. Economic utility is provided from construction of residential modules off-site, reducing construction costs.

OSM input

Iterations generated from

Building profiles generated from OSM input



Individual building profiles were allocated homing beacons to determine bearing

Homing beacon discloses additional telemetry information used for autonomous drone flight: building height, occupancy, wind speed, GPS, additional navigation telemetry, package details, and estimated package arrival.