COMMUNITY COOL

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CHALLENGES

EXISTING

PROPOSED

ACOUSTICS

Local Sound Pollution Stressors


150 dB

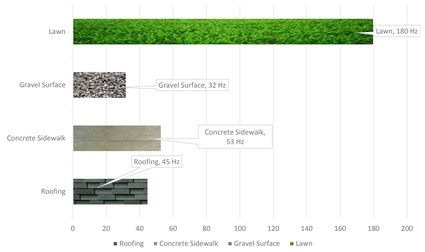

110 dB


85 dB


60 dB

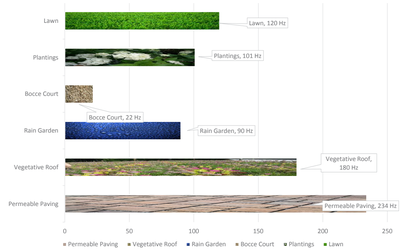
The selected site is currently being affected by sound pollution due to its proximity to a nearby airport, two industrial train lines, two highways, as well as busy local streets. These variables currently create noise pollution at levels above 90 decibels, which over time, will cause hearing impairment.

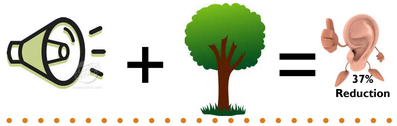
Existing Site Sound Absorption



In addition to being a nuisance, the EPA has also found that over time, psychological and physiological effects have been seen as a result of noise pollution. The increase of vegetation has conservatively raised the sound absorption coefficient to 746 Hz. This means that the overall sound pollution of the site is now being reduced by twenty-nine (29) decibels overall. This has reduced noise pollution by 20% overall. This reduction adds value to the property as well as improves the health of the residents of the neighborhood.

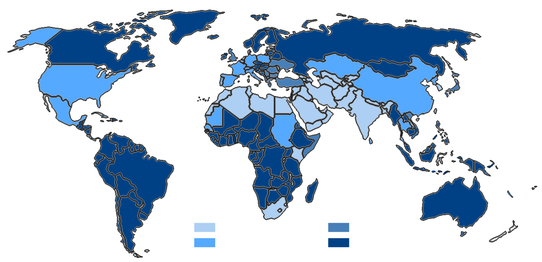
Proposed Site Sound Absorption





HYDROLOGY

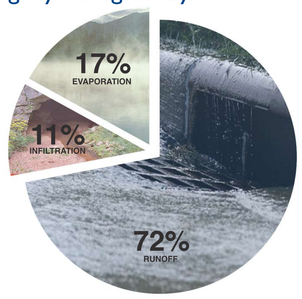
Global Water Pollution



Water Resource Stress

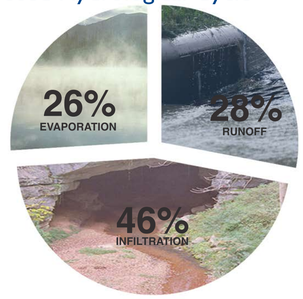
Fresh water stress is a major topic for discussion on an international scale regarding the problems posed by existing and future scarcity issues. With the projected population of the Great Lakes region to rise approximately 5,000,000 people over the next ten years by 2025 the population of the region will have increased by 10%. Based off of the assumption that the average person uses approximately 80 gallons of water per day this would mean that the Great Lakes region uses on average 4,442,000,000 gallons of water per day. By 2025, with projected population increases that number will rise to 4,854,250,000 gallons per day making the overall consumption of daily water usage within the Great Lakes region rise by 10% per day.

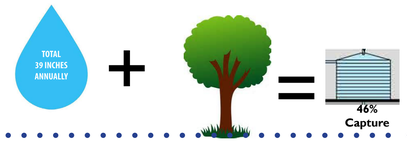
Existing Hydrological Cycle



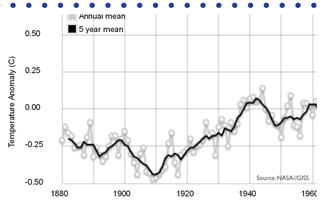
The site is being designed to have many low impact developments (LID) that help the site to collect water. To measure this, the EPA Stormwater Calculator was used. The site data was used to create a summary of the current site, and then to measure the runoff, infiltration, and evapotranspiration of projected inputs for the designed site. This project has chosen to increase water conservation through cistern storage and sizing. The cisterns will allow the reuse of greywater within Happy Dog and for irrigation on site. The proposal includes only 28% impermeable surfaces, resulting in an overall reduction of impermeability by 60%. The proposed materials were used to analyze the new hydrological flow on site. With the 39 inches of rain the site receives annually, 28% or 11 inches would go towards runoff, 26% or 10 inches would leave as evaporation and 46% or 18 inches would infiltrate the site.

Proposed Hydrological Cycle



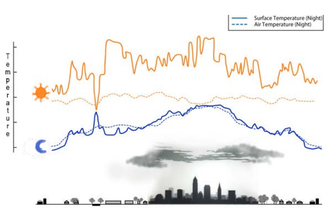


CLIMATE



Global Climate Change

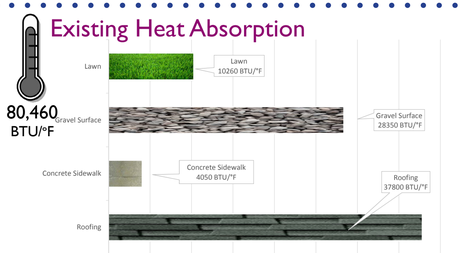
Globally, the climate is shifting. As early as 1995, the Intergovernmental Panel on Climate Change reported that there is a "discernible human influence on global climate." The warming trend has continued, with the year 2014 ranking as the warmest on record. (Source: NASA/GISS).



Urban Heat Island Effect

Exacerbating the issue is the effect of an urban heat island. The excessive absorption of the materials found in urban areas can cause surface temperatures to be 50–90°F hotter than the air (Source: EPA). The heat captured ends up radiating, thus increasing the ambient air temperature by as much as 22°F (Source: EPA). Surface urban heat islands, contribute to a host of problems, ultimately affecting a community's environment and quality of life.

Existing Heat Absorption



The use of materials with a high albedo, along with increasing plantings to aid in transpiration, can significantly reduce the impact of an urban heat island. To measure the mass heat absorption, the area of the materials were found, and then multiplied by its density and heat absorption coefficient. In treating heat island effect, it was found that heat island effect can raise the temperature of urban neighborhoods up to 22 °F. For this site, 17 °F was used as the maximum difference in temperature from urban neighborhoods to non-urban neighborhoods. Through site interventions, heat absorption was reduced by 43%, equivalent to a 7.5 °F reduction in ambient air temperature.

Proposed Heat Absorption