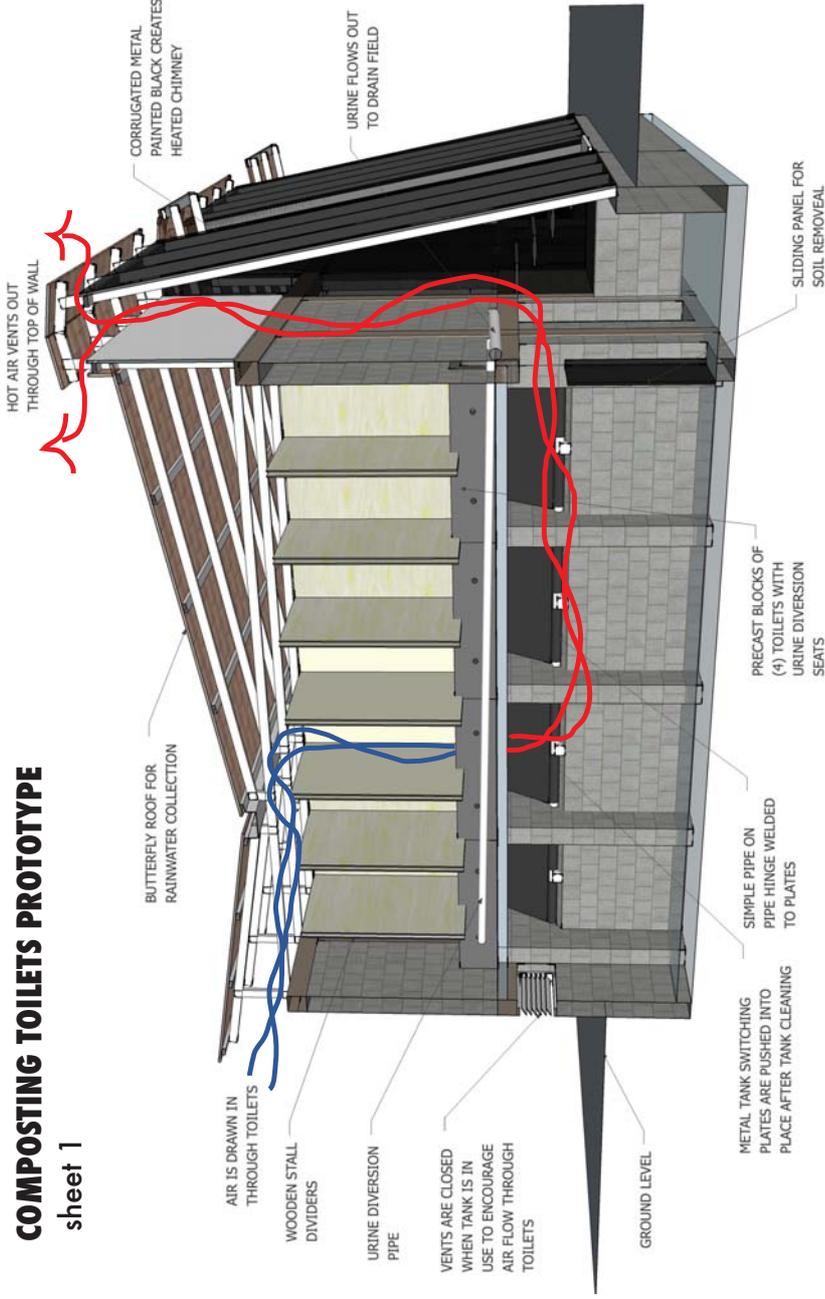


COMPOSTING TOILETS PROTOTYPE

sheet 1



LATRINE OVERVIEW:

A prototype latrine is developed here for an imagined school of 1000 students. The latrine contains (32) stalls and provides urinals for boys and urine diversion seats throughout.

The latrine consists of (2) rows of toilets that serve (4) compost bins below. This allows (2) bins to remain dormant for a period of (6) months after being filled in order to fully compost. During this time all human pathogens should be killed and the excrement broken down into good soil. This soil is a potentially saleable resource for the school or can be used for on site gardening.

COMPOST OVERVIEW:

The process of composting human waste to produce safe nutrient rich soil is a proven and effective way to manage waste. In Port au Prince where sewage is routinely dumped in the open to spread disease it is a particularly relevant technology.

Cholera and other Pathogens are destroyed as the pile heats up while composting. According to Joseph Jenkins' *The Humane Handbook* "Complete pathogen destruction is guaranteed by arriving at a temperature of 62 °C (143.6 °F) for one hour, 50 °C (122 °F) for one day, 46 °C (114.8 °F) for one week, or 43 °C (109.4 °F) for one month. It appears that no excreted pathogen can survive a temperature of 65 °C (149 °F) for more than a few minutes. A compost pile containing entrapped oxygen may rapidly rise to a temperature of 55 °C (131 °F) or above, or will maintain a temperature hot enough for a long enough period of time to thoroughly destroy human pathogens that may be in the humanure"

Organic material will need to be added to the compost after each use and upon switching tanks in order for the process to work. Establishing a reliable source for this material will be a crucial piece of the planning process. Wood scraps from a perfume factory, shavings from carpentry shops and cane scraps from a Rum producer have all been discussed as possible sources. A space for storing this material as well as providing easy access to it in each stall must be considered for the toilets to function.

Ventilation of the compost bins is also important. The large, heated chimney walls on the building's south face are meant to address this. Air is heated behind the black painted metal wall and rises, drawing air down through the toilets and across the compost helping to keep the smell out of the latrine. Screens at the top of the wall capture flies. The inactive bins draw air through operable vents on the north of the building, these vents should be closed in the active bins.

Urine Diversion is achieved through the use of urinals in the boys rooms and urine diverting toilet seats throughout. Keeping the urine and feces separate keeps the compost from smelling and allows the composting process to work more efficiently. Some level of urine mixing is expected though efforts should be made to minimize this. Urine can be used as a fertilizer when mixed with water or can be drained in a covered leach field or constructed wetland along with grey water.

FINISH Sanitation Challenge

COMPOSTING TOILETS PROTOTYPE

sheet 2



TANK SWITCHING SYSTEM:

The toilets are arranged in blocks of (4) with a hinged metal plate beneath each group allowing them to alternately fill (2) bins. This module can be repeated as necessary to achieve the required number of stalls. Each group of (4) seats are built into a precast concrete bench with holes to accommodate the urine diversion seats and urine outflow pipes. The metal plate between bins is pushed by hand to switch bins after the inactive tank has been cleaned each (6) months. The bins are managed and cleaned out via walkways in the compost area.

CALCULATIONS:

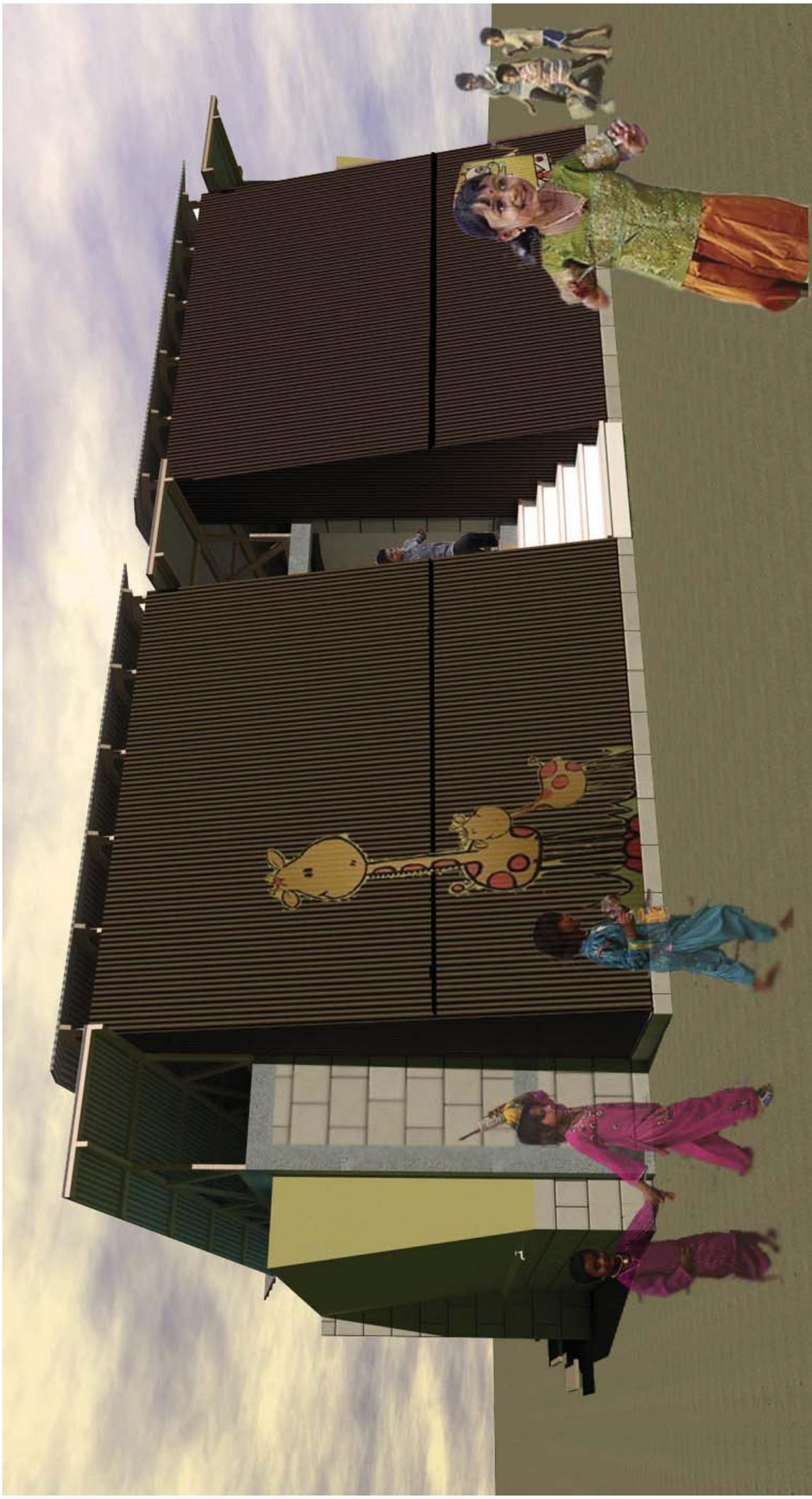
Each bin is designed to contain 13,800 liters of compost therefore, the latrine can accommodate 27,600 liters / 6 months.
 Expected volume from 1 student = 2.5 liters/week x 1200 students = 3000 liters/week
 Total expected volume including volume reduction factors = 25,000 liters / 6 month period*

* calculations based on spread sheet from ecosan - confirmation of calculations in progress.

FINISH Sanitation Challenge

COMPOSTING TOILETS PROTOTYPE

sheet 3



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