“Consilience” is a tortoise-shaped shelter providing a variety of multi-use human spaces that collects solar, wind and water. Consilience happens when multiple disciplines of human thinking arrive at the same conclusion. It is when poetry and science come together.

“Consilience” creates three physical layers of human spaces including a Nest, a Commons and an Observatory. The first layer, an unenclosed space is below grade underneath the shelter. The second layer, the Commons is a large gathering space inside the tortoise shell. The third layer is the balconies and observatories attached to the outside of the tortoise.

The tortoise is a symbol for Shelter. In addition to carrying its own house, the tortoise burrows into the earth to make more shelter. Within their burrows the Desert Tortoise creates a subterranean environment that is beneficial to other reptiles, mammals, birds and invertebrates. Desert tortoises spend most of their lives in burrows and rock shelters. They are geniuses at regulating body temperature and reducing water loss.

Our Tortoise is made from recycled materials.

This design will use 1120 square meters of reclaimed steel collected from junkyards. We strip the backing from car hoods to create a high quality, UV resistant pre-painted material with a rolled over factory edge. We will use steel salvaged from 800 automobiles. Human labor dedicated to the values of recycling transforms this material into high quality cladding. This material has a many-layered story that connects to our audience in expansive and specific ways.

The decking used throughout the Commons, balconies and observatories is made from 500 square meters of salvaged floor joists. We transform this nature-made carbon bank into a beautiful durable surface with a history embedded in it. Through refurbishing we create beauty and functionality while recouping the energy expended previously on these materials.

Our Tortoise will collect energy from the environment.

The south-facing side of the tortoise shell will be equipped with solar collecting technology. We expect to partner with a leading-edge solar company if given the opportunity to build Consilience. Even with the simplest solar technology available on the market today, we anticipate a level of energy collection that can be stored and used beyond the needs of Consilience itself. Based on the square footage of the solar array the tortoise shelter generates 70 megawatts annually, about the energy used by 6.5 households. Consilience allows for passive wind and water collection. Water collection occurs around the edge of the tortoise shell. Rock towers capture the wind. These passively collected resources go back into the shelter in the form of temperature control for the human spaces and landscaping around the artwork.

Our wind catcher consists of towers in the stylized form of the celebrated desert flower, Indian Paintbrush. The towers open to the prevailing wind direction and are adjustable. Wind is captured, piped underground, passed over water for evaporative cooling, and then redirected through vents into both the terraced nest and the interior shell space.

Site preparation includes displacing 700 cubic meters of earth, creating below-grade cool space and building up earthen berms above grade. These earthworks forge wind breaks and invent shade around the artwork. A sloped ramp at 4.8 degrees provides ADA access to terraced seating which is the focal point of the Nest. Stone masonry and hardscaping constructs the circular terraces. Our vision is to employ dry stone masonry to generate beautiful patterns, textures and color variance. These time honored techniques displayed by many cultures are also visible in the biomimicry of turtles.

Site work will include design and construction of passive water collection channels. Collection points and beds for vegetation will be put in place to cultivate native xeriscape landscaping. The edge of the tortoise shell will include a method to direct all water repelled from the shelter into the landscaped beds.

The Tortoise Nest is an Earth Sculpture. It is also a human space underneath the tortoise to meet and gather. A “cool” space in many senses of the word. Open space at eye level allows for a breeze and natural ventilation. A cool retreat in the hot desert for humans to view 360 degrees of Fly Ranch. While sitting under a monumental Desert Tortoise.

Our Tortoise is Built to Last.

Four foundation slabs are situated under each foot of the tortoise and are limited to the structural requirements for supporting the structure. These slabs include steel reinforcing rods and a steel anchoring system that will attach to the tortoise structure. Specifications will be approved by a Nevada engineer.

Each leg of the tortoise is a structural post made from factory rolled steel tubing with steel reinforcing as specified by engineered documents. These structural components are on the perimeter of each leg creating posts that are exceptionally strong to hold up the shelter. These posts create space inside the tortoise legs. These leg columns have custom internal stair cases and chase-ways for solar electrical systems.

The Tortoise Shelter consists of two primary structural systems.

The first is a post and lintel construction of the main interior floor of the Commons. This 371 square meter floor is realized through a system of I-beams supported by the four structural leg posts. Similar to those used in bridge construction, these I-beams are custom made sprung beams that carry massive loads with large spanning capacity. Hanging off the I-beams are steel trusses on 24 inch centers to support the reclaimed wood decking made from salvaged 3” x 12” floor joists. Though used here as a finished surface, these reclaimed joists have inherent structural properties. The underside of the shelter is the exposed system of I-beams and steel trusses. This allows for multipurpose use. Lighting, utilities, art installations, curtains, aerial systems can hang from the underside of the tortoise structure.

The second major structural element in the shelter is the tortoise shell. Factory rolled round steel tubing 12” in diameter creates a series of sprung arched ribs that attach to the post and lintel deck system. The interior perimeter of the shell is defined by a structural steel sill plate attached to the I-beam post and lintel system. These ribs are joined and reinforced with smaller tubing components forming a dome structure that takes advantage of an inherently stable and efficient geometry.

The dome structure is covered with a lattice of steel bar stock that provides attachments for both the solar array and the repurposed car hood cladding. The repurposed steel from car hoods is bolted on. This lattice grid will provide flexibility in maintaining and operating the solar and cladding systems.

Custom artistic metal work is used for all railings, seating and passages throughout the project. This incorporates the talents of blacksmiths, wood and metal artists from the greater Burning Man community. The structure also includes an ADA accessible lift providing access to the shell interior for everyone.

The tortoise head is cantilevered off the post and lintel I-beam system. The neck passageway features a staircase leading to the head. Another spiral staircase provides access to the Crown Observatory Deck on the head of the tortoise. This 9.2 square meter deck is surrounded by a crown shaped railing. The tortoise head has two one meter wide custom glass eye lenses. The tortoise eyes function as projection screens for video imagery and as sources for lighting effects and beacons projected outside the tortoise.

Engineered steel structural components are manufactured off site in a traditional manufacturing setting and later assembled on site. The installation of the solar array and car hood cladding happen on site.

The balconies and observatory decks total 47 square meters and include programmable light fixtures allowing for varied lighting situations. The shelter will produce ample energy for flexible power options including festival sound and lighting. Solar storage, electrical controls and utilities are situated along the interior perimeter of the shell space.

Rigging points throughout the structural components inside the tortoise shell allow for versatile spatial configurations including ropes courses, aerial performances, modular panels, video projections, art installations etc. On the north side, the dome structure has two levels of interior balconies forming landings at ten meter intervals up the shell. These interior balconies total 75 square meters and link the spiral staircases to the exterior balconies and observatory decks. They also provide further interior gathering location and viewing opportunities into The Commons.

All told, the project includes 1050 square meters of sheltered space. Maintenance for Consilience is minimal. The wooden and steel components have typical cleaning requirements. The mechanical elements (ADA lift, solar collection and storage, lighting fixtures, etc) have typical maintenance requirements.

This design’s order of magnitude cost estimate is $7 million. Consilience is scalable easily becoming larger or smaller. Our approach to creating a prototype is making a tortoise out of car hoods that is two meters tall, three meters wide and two meters deep.

The most significant environmental impact of the Consilience design is the procurement of the structural steel for the shelter; fabrication of steel components including welding and grinding metal; refurbishing reclaimed wooden joists; and shipping these components to Fly Ranch. These carbon-intensive activities are offset by our use of recycled materials.

On-site environmental impact of Consilience includes moving a significant amount of dirt; bringing in new materials like stone and hardscaping; pouring four concrete footings that are 3 meters in diameter; bringing in the equipment and labor necessary to construct the forms.