Introduction

Although this is an architecturally focused design program, I think it is an opportunity to showcase how a landscape can enhance the functions of the architecture as well as provide additional functions. Some of those general functions include storm water mitigation, creation of favorable micro-climates, provision of wildlife habitat, production of food, improvement of air quality which includes the sequestration of CO2 and last but not least, the improvement of public health and quality of life.

Erosion Control (Figure 1)

The erosion control plan for the construction phase of the project has many standard features such as a single layer silt fence around the perimeter of the property, a catch basin to collect storm water run off, a track mat where the driveway will eventually be to keep the road way clean. We are keeping the tree in the Northeast corner of the property so that will be protected with a temporary fence placed at the drip line of the tree. We are removing the existing Ash trees along the South side of the site as a preventative maintenance against the spread of the Emerald Ash Borer. Because of this, Ash wood will be soon be in high demand so we will be milling the tree trunks into benches, tabletops, etc. to use as furniture in/around the house. The un-millable branches and any other existing vegetation on the site will be chipped and used as mulch to cover the pile of excavated material to prevent erosion. Once the Ash trees are removed, that space will be allotted for a material & waste sorting station during the construction phase.

Design Approach

We began by using the iTree tool (found at www.itreetool.org) to create a baseline for the existing ecological functions of the site. Once these were established, we created the simple goal to improve upon these functions. We again used the iTree tool and overlaid our design components onto the site and worked the landscape until we achieved a landscape that was functioning at a productive and efficient rate.

Layout Plan (Figure 2)

The a-biotic factors included in the layout plan include a gravel termite barrier, a concrete-grass pave driveway and a composting station. The termite gravel barrier is discussed in section... (insert section where PJ discusses the functions of the termite barrier). The grass-pave driveway (figure 3) is a permeable surface that reduces runoff and has a high albedo rating, as opposed to traditional asphalt, which reflects solar energy helping to reduce the urban heat island effect. A composting station was located at the rear of the garage in an effort to reduce the amount of waste leaving the site.

Plant Material

All the plants in the landscape are native and/or drought tolerant (figure 4). A few notable functions of the landscape include food production of the service berry that produces food for both humans and birds. There is a mass planting of Orange Butterfly Weed which is a food source for Monarch Butterflies and this plant is considered a vulnerable species in NY. The lawn is a "No Mow"turf grass that tops out at approx. 6" and requires no irrigation (figure 5). If the homeowner chooses to mow the lawn on a regular basis, this seed mix will function as a traditional lawn does.

FIGURE 1

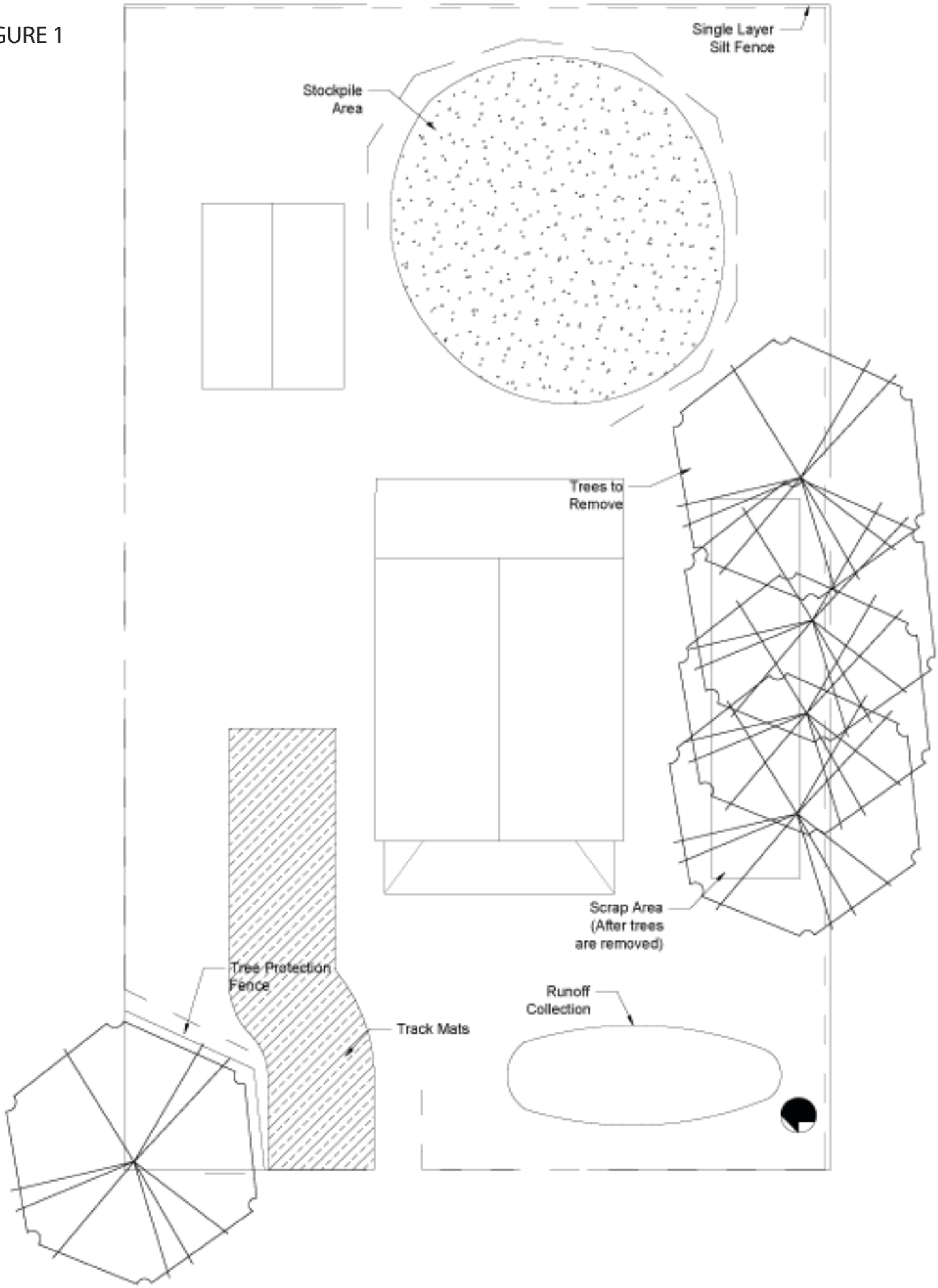

Single Layer
Silt Fence
Stockpile
Area
Trees to
Remove
Scrap Area
(After trees
are removed)
Tree Protection
Fence
Track Mats
Runoff
Collection

FIGURE 2

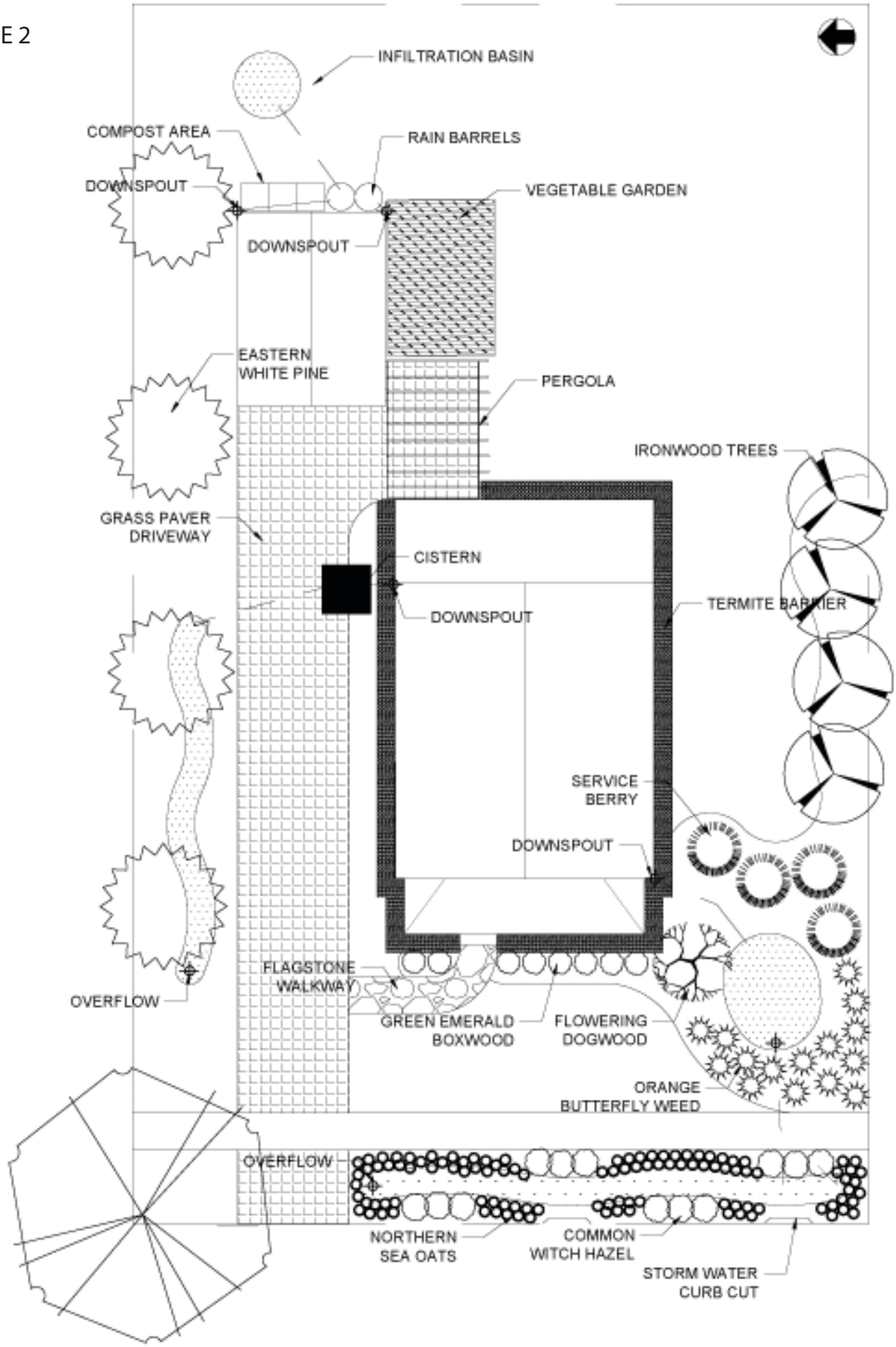

INFILTRATION BASIN
COMPOST AREA
RAIN BARRELS
DOWNSPOUT
VEGETABLE GARDEN
DOWNSPOUT
EASTERN
WHITE PINE
PERGOLA
IRONWOOD TREES
GRASS PAVER
DRIVEWAY
CISTERN
DOWNSPOUT
TERMITE BARRIER
SERVICE
BERRY
DOWNSPOUT
FLAGSTONE
WALKWAY
OVERFLOW
GREEN EMERALD
BOXWOOD
FLOWERING
DOGWOOD
ORANGE
BUTTERFLY WEED
OVERFLOW
NORTHERN
SEA OATS
COMMON
WITCH HAZEL
STORM WATER
CURB CUT

FIGURE 3

http://www.hearth.com/talk/attachments/largeimage-jpg.41986/

FIGURE 4

COMMON NAME	SCIENTIFIC NAME
RED SPRUCE	PICEA RUBENS
IRONWOOD	CARPINUS CAROLINIANA
FLOWERING DOGWOOD	CORNUS FLORIDA
BOXWOOD	BUXUS spp.
SERVICEBERRY	AMELANCHIER spp.
ORANGE BUTTERFLYWEED	ASCLEPIAS TUBEROSA
NORTHERN SEA OATS	CHASMANTHIUM LATIFOLIUM
COMMON WITCH HAZEL	VIRGINIANA HAMMEMELIS

FIGURE 5

http://forums.gardenweb.com/forums/load/natives/msg0508084117496.html

Energy Consumption (Figure 2)

There is an evergreen windbreak along the North side of the property which functions as a traditional windbreak. There is also a deciduous tree planting along the South side of house (Figure 2). The deciduous planting was chosen specifically to be ironwood tress for two reasons. The first being their deciduous characteristic.. There is a solar thermal system located on the South facade of the house and the shading provided by these trees in the summer prevent this system from over functioning in direct summer sunlight. In the winter, these trees drop their leaves, allowing maximum solar exposure to the solar thermal system allowing for productive, efficient functioning year round. The second reason Ironwood trees were chosen was for their growth habit. These trees top out at approx. 20 feet tall which allows them to grow naturally without ever shading the photovoltaic system located on the South roof of the house. These two plantings, the evergreen windbreak and the Ironwood tree planting combine to save the homeowner over 91,000 kilowatt-hours of electricity and reduces heating fuel cost bu almost 13,000 therms over the expected 100 yr. Life span of the landscape. A few other benchmark functions of the landscape over its lifetime include the mitigation of over 1.3 million gallons of storm water and the sequestration and avoided production of over 88,000 lbs of CO_2 which is the equivalent to removing 8 cars from the road. All the ecological functions of the landscape, when quantified into a dollar amount totals over $50,000

Rain Water Capture (Figure 6)

There are two artificial components to our storm water management system. The first is two 50 gal. Rain barrels that are located behind the garage that will be used to irrigate the vegetable garden. The second is a 500 gal. Cistern that is buried under the driveway in close proximity to the house that will collect rain water from the house roof and discharge from the sump pump. The initial purpose of the cistern will be to decrease peak flow coming from the property and will be emptied into one of our infiltration basins between storm events. The homeowner can choose to upgrade the cistern system to tie it back into the house to use the water to flush toilets, etc.

Storm Water Management (Figure 7)

We are managing the storm water on the site through three infiltration basins. These basins are designed to have a very low visual impact and average a depth of only 6". Two of the basins are part of the lawn as inconspicuous depressions and the third is tucked away in a planting bed. These three basins can handle all the 1,317 gal. Of storm water run off from the average 90% storm event.

Save the Rain (Figure 8)

By volunteering a small portion of our site, the tree lawn between the road and the sidewalk, to handle storm water from the road, we qualified for a $50,000 grant from the Save the Rain program here in Syracuse. We designed this area as a combination compacted gravel basin and a ponding depression system. The total capacity of the system is 10,400 gal. To put this into perspective, that equates to the runoff produced by 610 linear feet of road that is a standard 30 ft wide. The plant material in this basin is also native and is salt tolerant to survive the salting of the roads during our long upstate winters and are of short stature as to not interfere with the utility wires overhead.

FIGURE 6

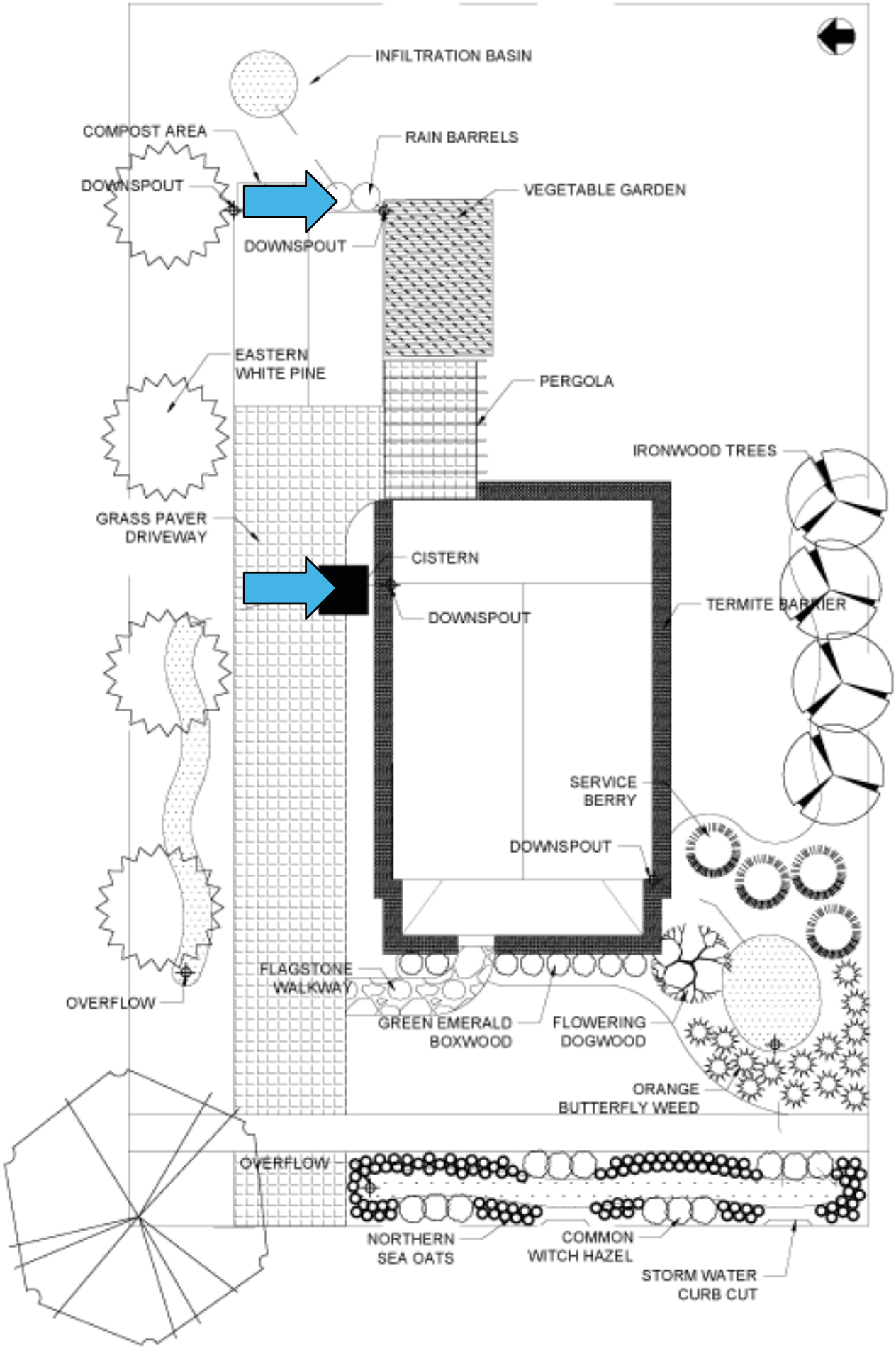

INFILTRATION BASIN
COMPOST AREA
RAIN BARRELS
DOWNSPOUT
VEGETABLE GARDEN
DOWNSPOUT
EASTERN
WHITE PINE
PERGOLA
IRONWOOD TREES
GRASS PAVER
DRIVEWAY
CISTERN
DOWNSPOUT
TERMITE BARRIER
SERVICE
BERRY
DOWNSPOUT
FLAGSTONE
WALKWAY
OVERFLOW
GREEN EMERALD
BOXWOOD
FLOWERING
DOGWOOD
ORANGE
BUTTERFLY WEED
OVERFLOW
NORTHERN
SEA OATS
COMMON
WITCH HAZEL
STORM WATER
CURB CUT

FIGURE 7

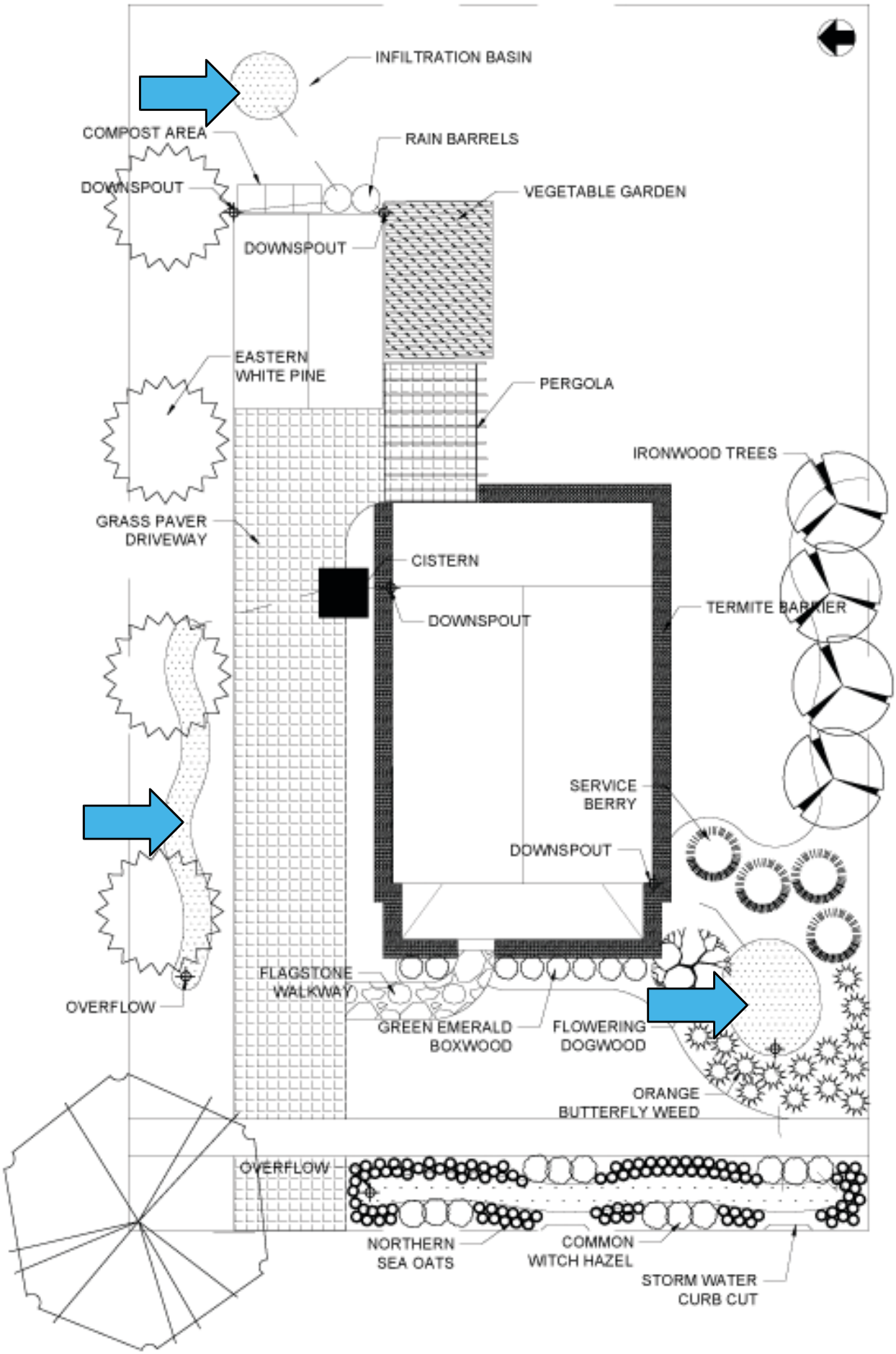
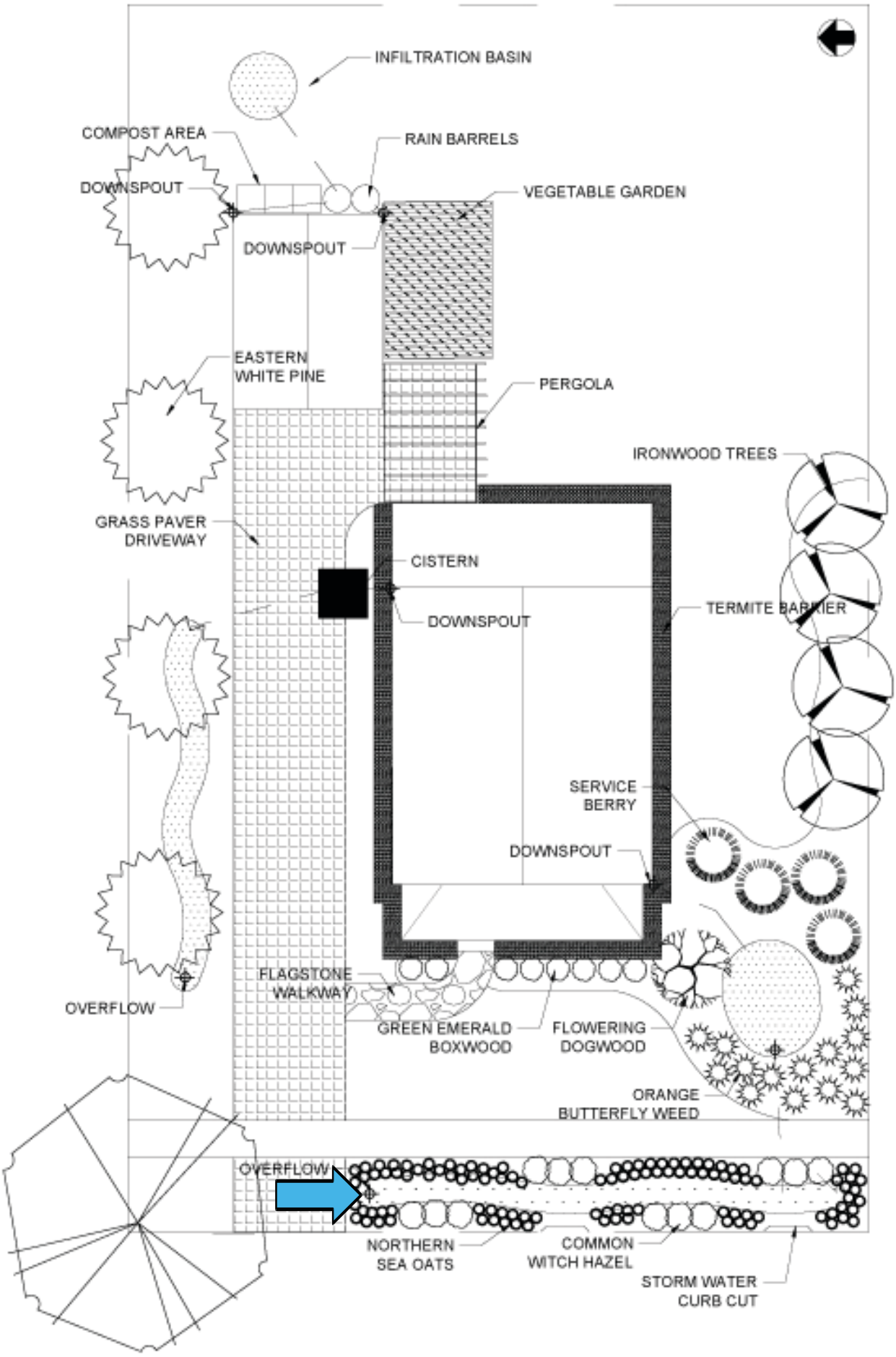

INFILTRATION BASIN
COMPOST AREA
RAIN BARRELS
DOWNSPOUT
VEGETABLE GARDEN
DOWNSPOUT
EASTERN
WHITE PINE
PERGOLA
IRONWOOD TREES
GRASS PAVER
DRIVEWAY
CISTERN
DOWNSPOUT
TERMITE BARRIER
SERVICE
BERRY
DOWNSPOUT
FLAGSTONE
WALKWAY
OVERFLOW
GREEN EMERALD
BOXWOOD
FLOWERING
DOGWOOD
ORANGE
BUTTERFLY WEED
OVERFLOW
NORTHERN
SEA OATS
COMMON
WITCH HAZEL
STORM WATER
CURB CUT

FIGURE 8


INFILTRATION BASIN
COMPOST AREA
RAIN BARRELS
DOWNSPOUT
VEGETABLE GARDEN
DOWNSPOUT
EASTERN
WHITE PINE
PERGOLA
IRONWOOD TREES
GRASS PAVER
DRIVEWAY
CISTERN
DOWNSPOUT
TERMITE BARRIER
SERVICE
BERRY
DOWNSPOUT
FLAGSTONE
WALKWAY
OVERFLOW
GREEN EMERALD
BOXWOOD
FLOWERING
DOGWOOD
ORANGE
BUTTERFLY WEED
OVERFLOW
NORTHERN
SEA OATS
COMMON
WITCH HAZEL
STORM WATER
CURB CUT