



Demonstration Project

The master plan process included the exploration of a green infrastructure demonstration or catalyst project that would be advanced further in design so that grant and donor funds could be solicited for further design, construction documentation and even construction. The open space north of the elementary school and south of the School Forest was selected as the designated site. As we imagined what the master plan could look like we also advanced the layout of this specific site at a high level. Once the advisory committee and stakeholders approved of the site, we had the area surveyed. We overlaid these detailed existing conditions with our proposed conceptual plan and advanced the design by creating a more detailed area relationship diagram. The conceptual site plan evolved and became more detailed fitting to the existing conditions present on site.

Area Relationship Diagram

The catalyst site is organized in thematic spaces for students to grow, gather, monitor, flow, collect, and learn.

GROW

An area for students and teacher to observe plant growth. Plants are supported by water runoff that travels through the art gutter wall down to the rain garden. This area will feature native plants from Wisconsin.

GATHER

A flexible space where students and teachers can gather for individual and group activities such as reading or creating art.

MONITOR

An area where students can monitor animal activities and water levels. The monitoring platform allows for students to interact with the pond and collect samples.

FLOW

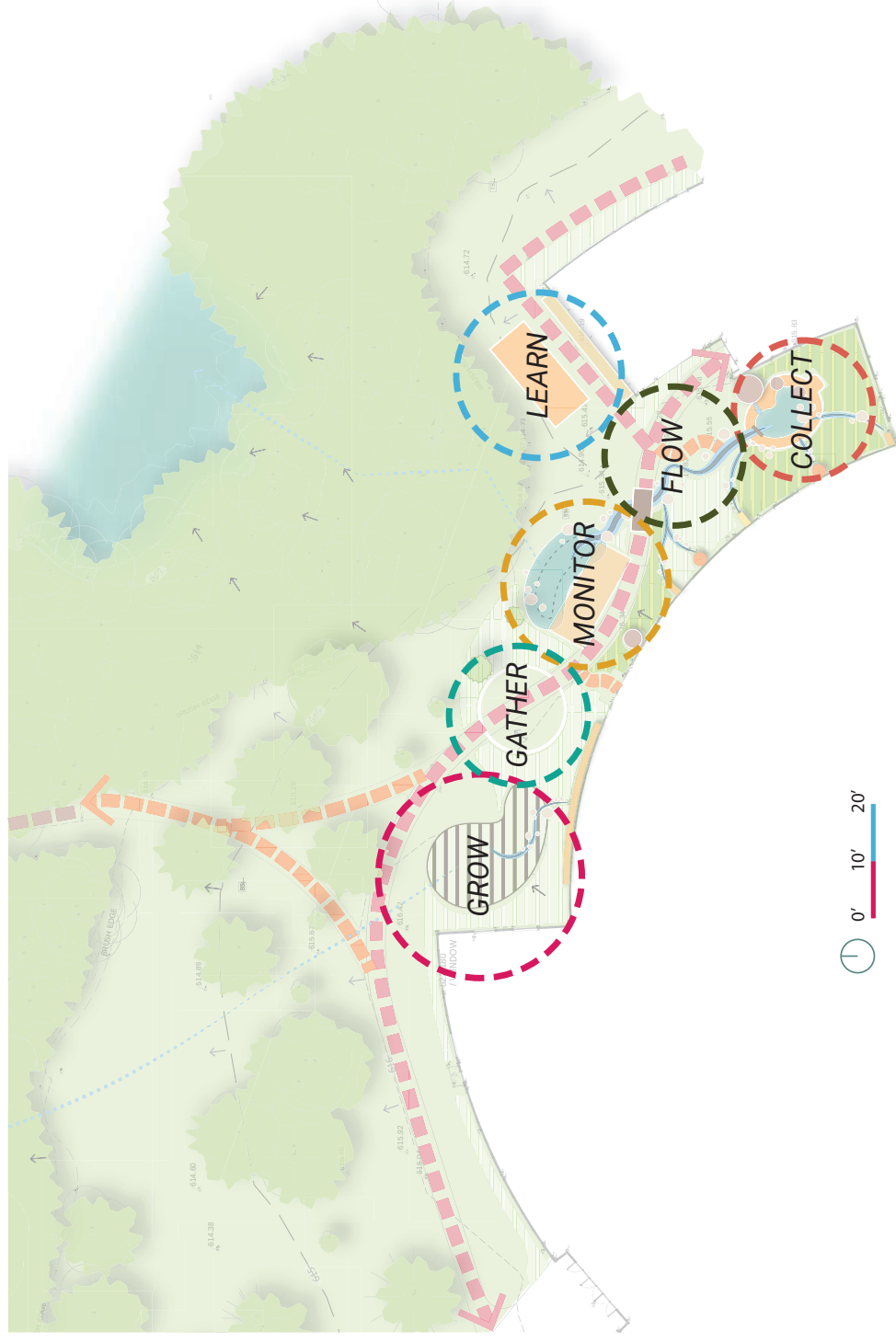
An area where students can observe water flow from the upper pond to the lower pond. The interactive dry riverbed incorporates a series of water play elements like dams and gates for students to experience water in different ways.

COLLECT

A pond where water is collected from the roof via gutters, cistern, water trough, rain chains, and downspout planter.

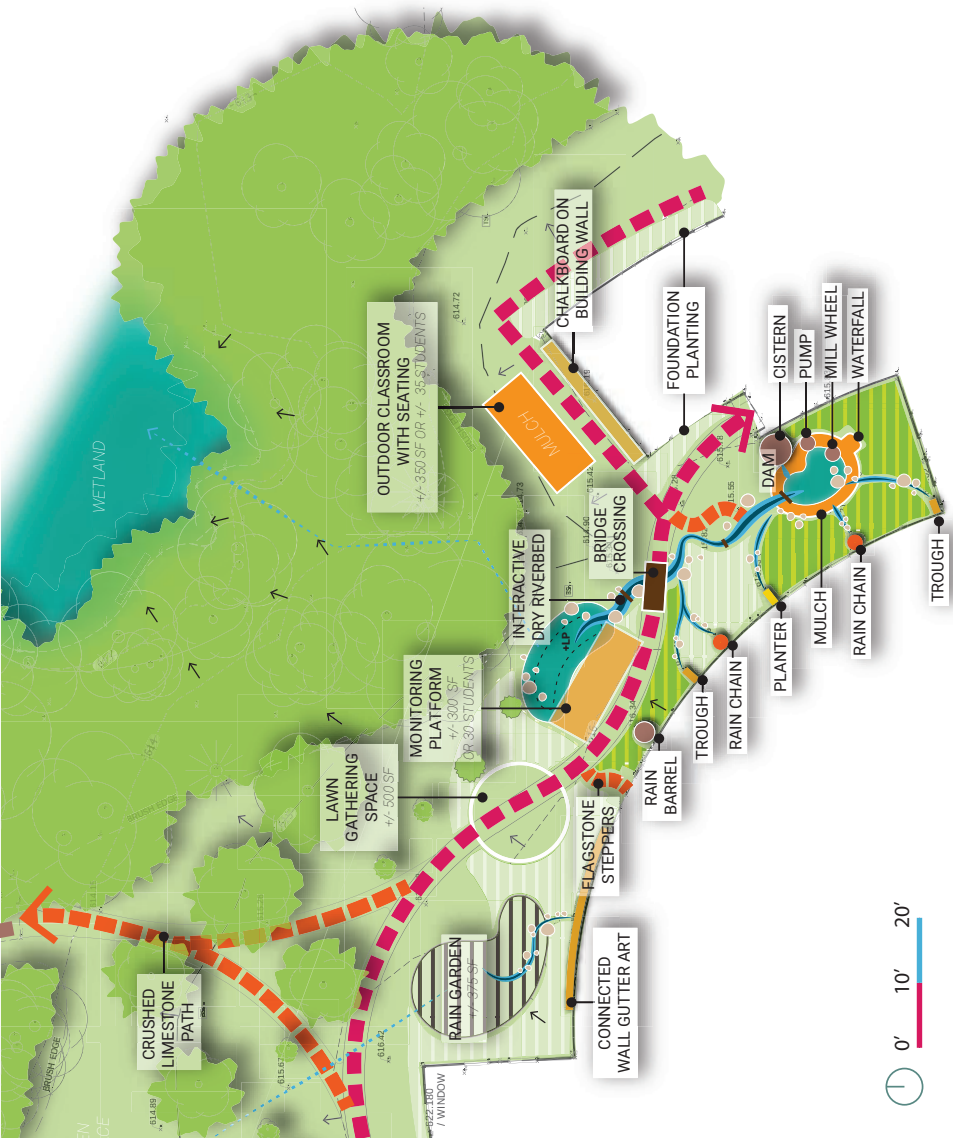
LEARN

An area for teachers and students to gather for a more formal outdoor learning experience. This area features log benches, shade canopy, and instructional writing surface.



Area Relationship Diagram

Program Element	Activity / Curriculum
Interactive dry riverbed	• Observing water cycle and water flow • Rocks and minerals
Pond and Water Monitoring Platform	• Sink and Float • Water Quality Monitoring • Catch bugs, insects, minnows
Damming	• Observe how dam works and how it affects water flow • Water recycling • Use critical thinking/problem solving skills to stop/control water flow
Wave Action	• Observe how waves are created
Waterfall	• Visual and Auditory • Observe water flow
Garden / Planting areas	• Contained Herb Garden
	• Sensory Plants
	• Chlorophyll painting
	• Natural dye garden
	• Pollinator garden
Cistern	• Flower pressing class
	• Observe weather and seasons
	• Soil exploration
	• Observe water collection and can be used to fill dry-river bed or to water plants
	• Learn about water conservation
Water pump	• Observe water flow
Water play equipment	• Observe water flow and water table
Bridge	• Cross interactive dry river bed
Mill Wheel	• Observe water flow and generate power
Benches	• Outdoor Classroom Seating
Water Troughs	• Build water chute





Interactive Green Infrastructure Outdoor Education

Outdoor Classroom

Located between the School Forest and the elementary school and east of the dry riverbed this space offers an opportunity to bring the class outside for instruction and offers additional unstructured play space. This space will include:

- Outdoor classroom/demonstration space with black or white board on the way
- Open air or tensile shade structure for inclement weather and solar protection
- Seating for a minimum of 15 students
- The space could be equipped with wifi to support the use of technology and equipment like phones, tablets and laptops
- Natural material and fun site furnishings and pop art wall mural

- **Curriculum opportunities to teach traditionally, just outside**

Dry Riverbed

Located between the School Forest and the elementary school, the dry riverbed originates within the pocket of the elementary building. This rock lined riverbed offers an opportunity for students to study and interact with stormwater as it moves through the riverbed. The dry riverbed is designed to transport water from five of the roof spouts, flowing from the building toward the wetland, capable of holding approximately 26 cubic yards of rainwater in the lower pond and 5 cubic yards in the upper pond. This space will include:

- 30+ cubic yards of water retention between the upper and lower ponds from five of the roof spouts
- Mulch areas for students to play and access features along the riverbed
- Rock riverbed to filter water and allow students to walk in and across the riverbed

- Boardwalk bridge crossing to provide access across the riverbed
- Science/Observation platform for water testing and monitoring
- Bar gates to provide interaction with water flow
- Water switch to provide interaction with water diversion
- Waterfall to create a focal point at the origination of the riverbed and provide water outside rainfall events through passive means
- Pump and log chute for interactive water play and providing water outside rainfall events through interaction
- Underdrain to prevent water stagnation and drain overflow

- **Curriculum opportunities to teach about watersheds, water cycle, water quality, stormwater runoff, pollutants, water catchment, water flow, etc.**

Galvanized Steel Cistern

Located on the eastern wall of the building pocket within the elementary school and east of the dry riverbed the cistern provides storage for 5,000 gallons of rainwater. This feature will include:

- An overflow drain
- Corrugated steel walls
- Lockable access and removable ladder for maintenance needs and safety

- **Curriculum opportunities to teach about water catchment and uses for captured stormwater.**

Downspout Planters

- Located below the roof spouts on the elementary school and below the gutter art wall this feature offers an opportunity to observe the cleaning of rainwater. This feature will:
- Provide a contained water filtration system

- Native plants will filter pollutants and provide habitat for pollinators

- **Curriculum opportunities to teach about water filtration and use of native plants to filter pollutants and provide habitat for pollinators.**

Rain Chains

Located on three of the elementary school roof spouts this feature offers a tranquil interaction with rainwater as it is guided from the roof spout to the ground.

- Curriculum opportunities to teach about mindfulness and functional art.

Rain Barrel

Located against the north wall of the elementary school and under a roof spout. This feature offers rain catchment for 1,500 gallons of water.

- Provides opportunity to use rainwater to water planting throughout the catalyst site
- Feature an overflow drain

- **Curriculum opportunities to teach about water catchment and gardening**

Gutter Wall Art

Located on the north wall of the elementary school and south of the rain garden, this feature offers the opportunity to turn water catchment into a sculptural art piece. The gutter wall transports water from four roof spouts down to a downspout planter. This feature will include:

- Fun and bright nature themed mural
- Functional sculpture made of gutter segments and down spouts

- Native plants in downspout planter to provide water filtration and pollinator habitat
- **Curriculum opportunities to teach about sculptural art from common objects, water flow, and water catchment**

Rain Garden

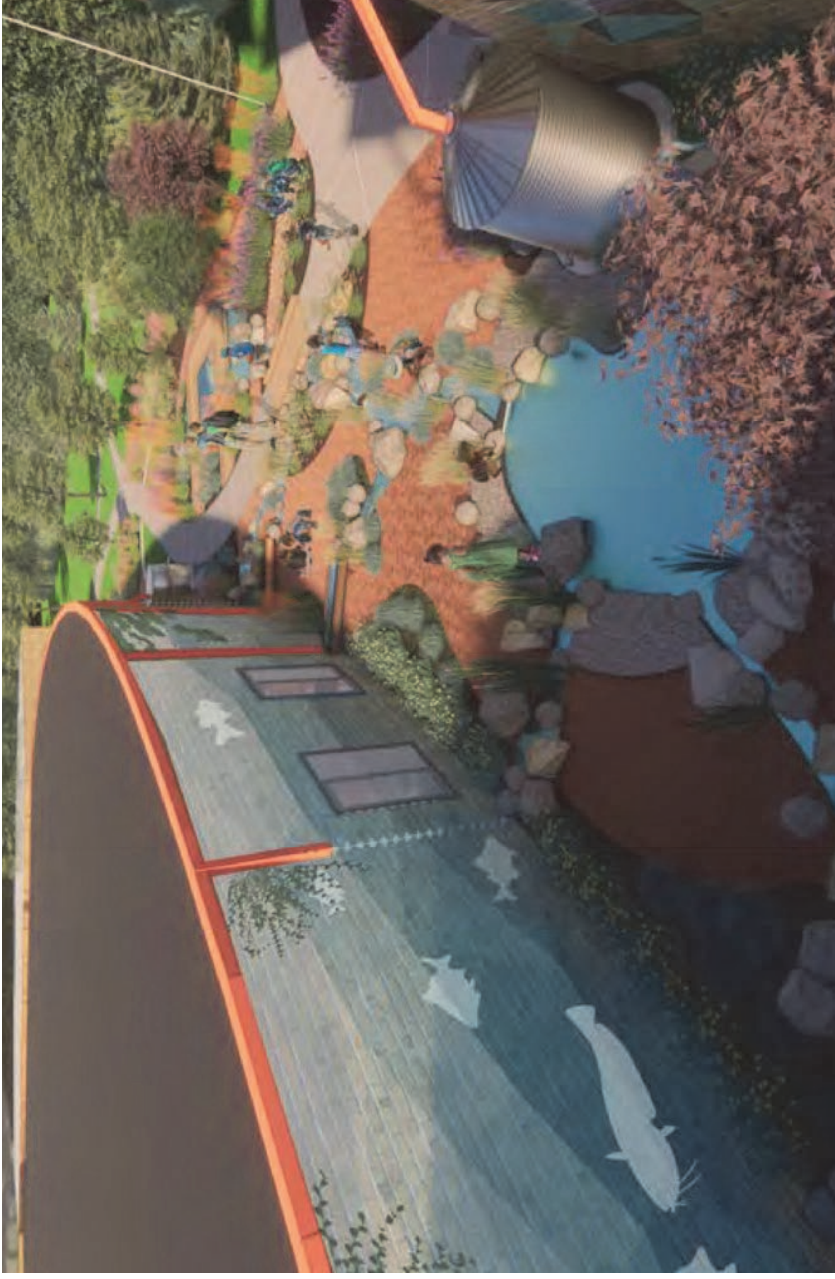
Located between the School Forest and the elementary school and west of the dry riverbed, this space offers an opportunity to temporarily hold approximately 260 SF of rainwater. Deep rooted native plants filter pollutants out of water and allow slow water infiltration. This space will include:

- A downspout planter to transport water from gutter wall to rain garden
- 75 native plants suitable for shade rain gardens
- Underdrain to prevent water stagnation and drain overflow
- **Curriculum opportunities to teach about native plants, carbon sequestration, pollution, plant communities, pollinators and pollinator habitat, water infiltration, and water flow**

Reading/Art Circle

Located between the School Forest and the rain garden and west of the dry riverbed this space offers an opportunity to bring the class outside for instruction, reading/story time, or art class; and offers additional unstructured play space. This space will include:

- 330 SF of lawn space
- **Curriculum opportunities to teach traditionally, just outside**



Birds eye view showing upper pond and interactive dry riverbed, cistern, wall mural, rain chains, water trough, and boardwalk bridge

Design Development

The green infrastructure catalyst site is comprised of four main components: a dry riverbed, a rain garden, water catchment infrastructure, and outdoor classroom spaces that will facilitate water catchment and treatment of runoff from 14,000 SF of roof and 3,000 SF of landscape areas.

The dry riverbed is the main feature of the site and provides opportunities for students to interact with stormwater in a myriad of ways. The riverbed is designed to hold approximately 6,500 gallons of water between the upper and lower ponds. During rain events the rain will move from the roof either down a rain chain and directly into the dry riverbed, or through a downspout into either a downspout planter to be cleaned by native plants or into a trough to allow for interactive play before entering the dry riverbed. Runoff from the landscape areas and mulched pathways will flow via passive drainage to the dry riverbed as well. During rain events



Perspective showing lawn gathering area, gutter wall art, rain garden, and rain barrel

that produce more than 6,500 gallons of water the overflow will be allowed to flow out of a four-inch underdrain to the wetland located north of the school.

The dry riverbed allows students to interact with runoff as it flows from the rain chains, downspout planter, and downspout trough, into the upper pond, through the bar gates and water switch along the riverbed swale and into the lower pond. The lower pond allows water collect and students to access the water via the observation deck. The rock mulch, boulders, and pockets of plantings throughout the riverbed slow the flow of water through

the swale. Wood mulch pathways and areas surrounding the riverbed give students access to the bar gates, water switch, and riverbed.

There are several opportunities for passive interaction with water via both audio and visual observation. The waterfall creates a focal point at the origination of the riverbed and provides water via a potable water connection outside rainfall events. The waterfall and rain chains provide tranquil sound within the catalyst site. The downspout planter also provides a passive interaction by catching water from a downspout and temporarily holding the water while

plants filter and take up water before releasing the remaining water into the riverbed. The downspout planter provides habitat for pollinators and an opportunity for students to study the pollinators, native plants, and learn to tend to this natural community.

Opportunities for active interaction within the dry riverbed allows students to learn through play. The water pump and log chute provide an opportunity for students to access water within the riverbed outside of rain events via a potable water connection. The water pump also gives students control over the amount of water entering the riverbed. The log chute and downspout trough are opportunities for students to experiment with damming and controlling water flow before it drains into the upper pond. Along the swale that connects the upper and lower ponds are two bar gates and a water switch. The bar gates allow students to stop the flow of water. The water switch allows students to control the flow of water either through a meandering route or a direct route.

The gutter art wall and rain garden work together to move roof runoff down a maze of gutters through a downspout planter and finally into a rain garden. The rain garden allows water to temporarily collect and slowly infiltrate into the ground. Suitable native plants provide pollinator and small animal habitat while filtering pollutants out of the water. A four-inch underdrain allows excess water to be drained to the wetland during large storm events.

To calculate roof runoff and size the dry riverbed ponds and rain garden, the roof area was divided into pie like segments halfway between each downspout. The areas for each downspout draining into each feature were added together to find the square footage of the roof area. This was added to the square footage of the landscape area that will passively drain into each feature. This was then divided by 20 to reach the 20% of the runoff area.

Runoff is stored in two catchment features, a 1,500-gallon rain barrel and a 5,000-gallon steel cistern. These two features are designed for catchment demonstration. Although they can hold a substantial amount of water, they do not hold the full potential of water that will flow from the roof (approximately 25,000 gallons over three months). The water that is caught and stored can then be used to water the lawn and plantings within the catalyst site.

The outdoor classroom to the east of the dry riverbed offers a sheltered space that can be used for unstructured play and traditional classroom instruction. Log benches provide seating for students and two 4'x6' white boards provide a writing surface for teachers. A tensile shade structure provides refuge from sun, wind, rain, and snow. The reading/art circle offers an opportunity to



Perspective of outdoor classroom with backless log bench, board, mural, and tensile shade structure

bring the class outside for instruction, reading/story time, or art class and offers additional unstructured play space. This 330 SF lawn circle is surrounded by a one-foot concrete maintenance curb and planting beds to give feeling of enclosure.

Catalyst Site Phasing

The catalyst site can be phased into five projects and eight additional initiatives that can be completed independently or in combination. The five projects are:

- Dry Riverbed
- Primary Sidewalk and Reading Circle
- Outdoor Classroom

- Rain Garden and Gutter Wall
- Secondary Sidewalks

The dry riverbed should be the initial project installed and must include the installation of the waterfall and water pump with log chute including the potable water connections, and the boardwalk bridge over the riverbed. The walkways can be mowed through the grass as informal walkways until funding is procured to install the concrete sidewalks. The outdoor classroom can be built in two phases; the first would include the log benches, white boards, and mulch; the second is the tensile shade structure. The rain garden should be built in combination with the gutter art wall to facilitate the flow of roof runoff to the rain garden as designed.

The additional initiatives vary in their level of effort ranging from movable water troughs to the 5,000-gallon steel cistern. They include:

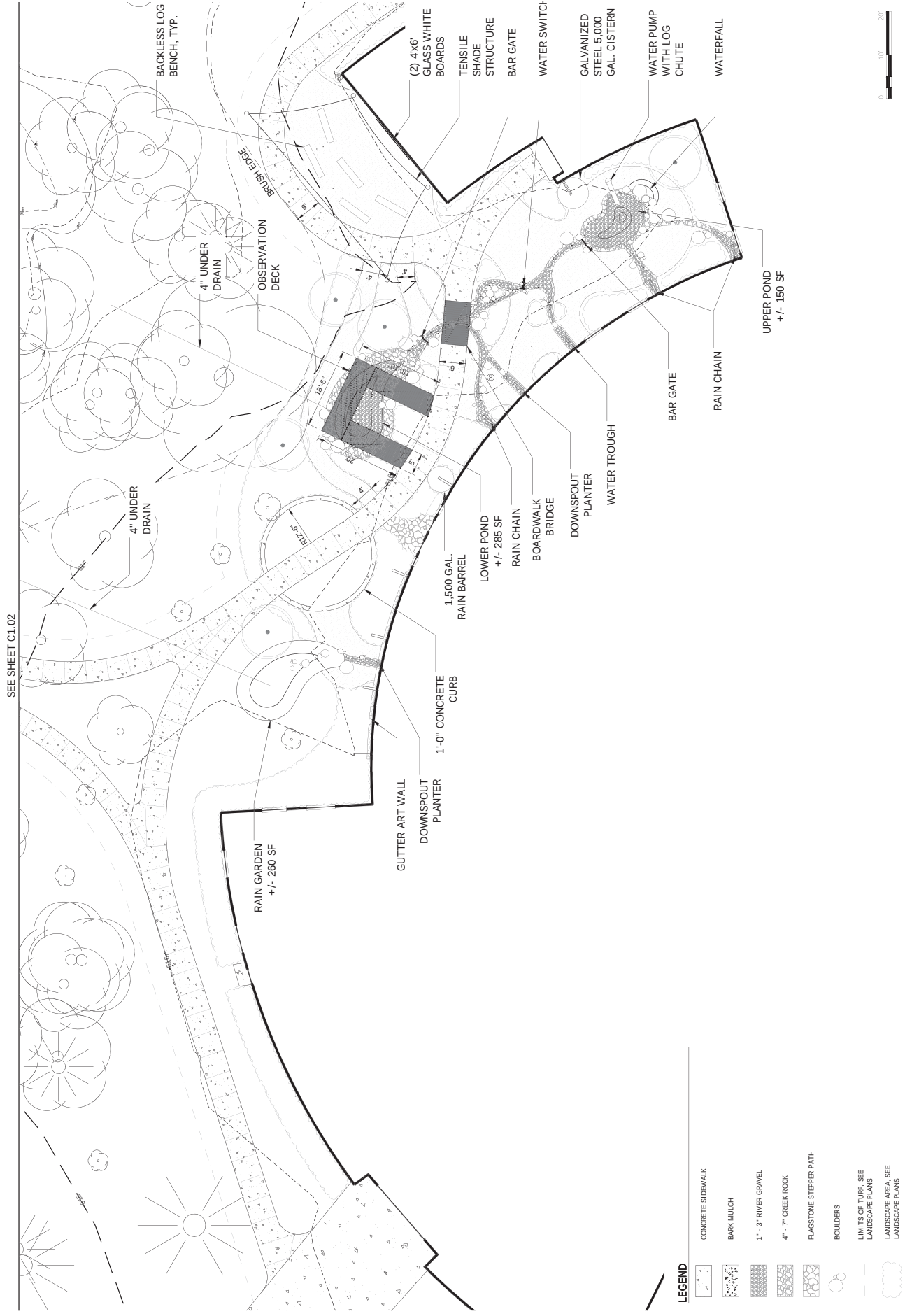
- Lower Pond Observation Deck
- Steel Cistern – 5,000-gallon
- Rain Barrel – 1,500-gallon
- Downspout Planters
- Rain Chains
- Natural Flagstone Walkway
- Art Murals
- Movable Water Troughs



Perspective showing interactive dry river bed, water switch, downspout planter, rain garden, boardwalk bridge, rain barrel, and lower pond with observation deck

Curriculum Opportunities

- *Watersheds*
- *Water cycle*
- *Water quality*
- *Water catchment*
- *Water flow*
- *Captured stormwater use*
- *Water filtration with native plants*
- *Water infiltration*
- *Stormwater runoff*
- *Pollutants*
- *Carbon sequestration*
- *Pollinator habitat*
- *Native plants and plant communities*
- *Gardening*
- *Mindfulness*
- *Functional art*
- *Sculptural art from common objects*
- *Installation art*



SEE SHEET L1.02





