WATER IN OUR SCHOOLYARD

Water is affected by the Earth's gravity. It always flows from higher parts of the landscape to lower parts. If there is a hole in the ground, water will flow into it and fill it up until it spills over, it will then flow to the next lowest point in the ground. We can change how *stormwater* flows by creating low points in a *swale* that work like a creek to direct the stormwater into a drain that connects to a river.

Right now, the *stormwater* in our schoolyard does not move towards the drain because the ground is very flat. The stormwater flows into the closest lowest points where it gets stuck, creating puddles and wet, muddy areas.

To help the stormwater move out of the areas where we play and towards a drain, we need to dig a swale where the ground gets the wettest so that stormwater can flow towards the drain. We also need to make sure that the ground closest to the school is higher up than the swale so that all the stormwater can flow into the drain.

The original design for the schoolyard included a drainage swale around the outside. This swale is located where there is currently extensive ponding, indicating that it is not deep or steep enough to carry the stormwater to the catch basin.

The area in blue is where there should be a swale for the stormwater, but the ground is too flat for stormwater to flow easily into the swale, and the swale is not deep enough for the stormwater to flow to the drain. The white arrows show the direction the water should flow.

DRAINAGE + TARMAC AREA

DRAINAGE DESIGN INTENT

To mitigate the ponding and wet areas in the schoolyard a two part strategy is proposed:

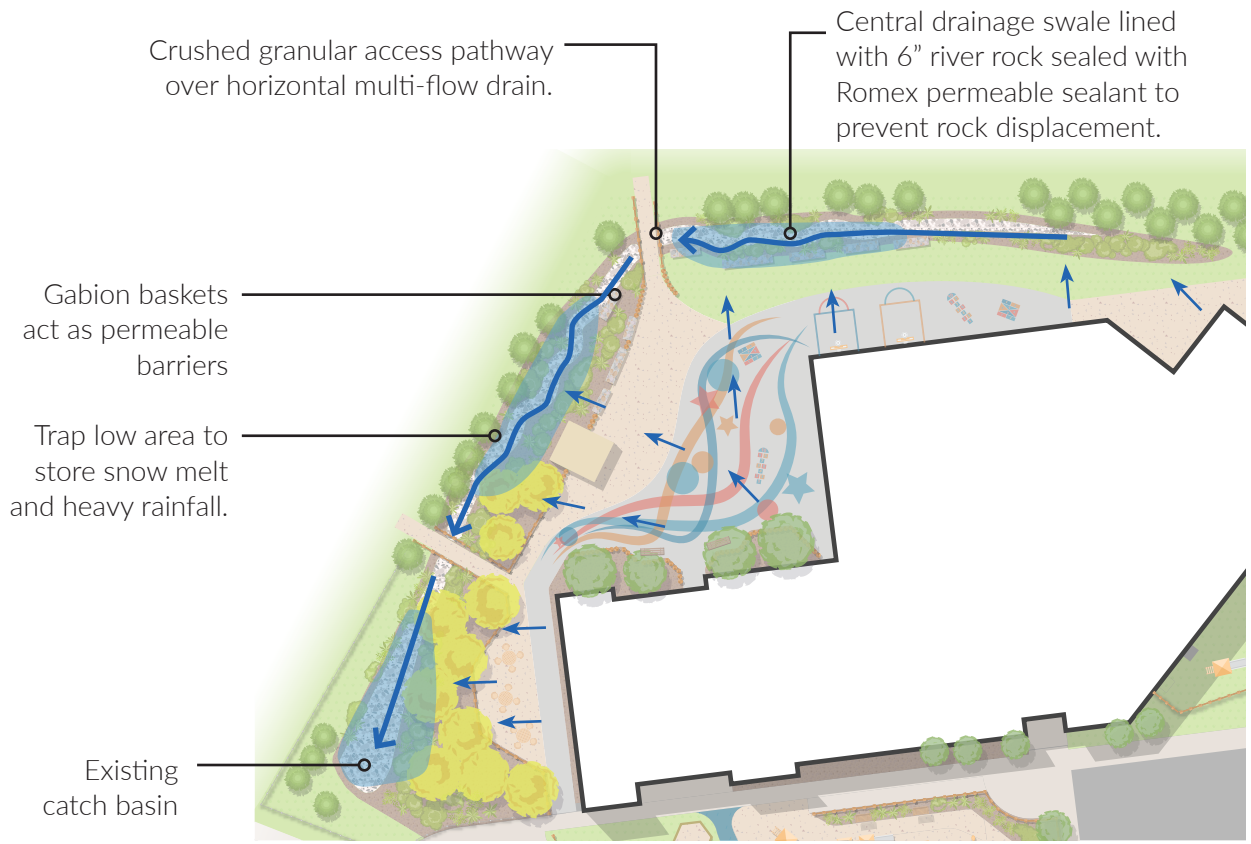
1. Improve the ability of the landscape to absorb water.
2. Direct surface water from the landscape towards a catchbasin.

A swale that wraps the northern part of the schoolyard uses both of these strategies to ensure that play and learning spaces stay dry and useable year-round. For the system to function there must be a miniumum 2% slope towards the swale, and a min. 2% slop across the length of the swale to convey the water to the catch basin. As the site is quite flat, these grades will likely be achieved using a system of trap lows where water is able to pond to a certain level before it passes through a culvert into the section of the swale.

The crossings over the swale also serve as flow regulators for the system. Horizontal, multi-flow culverts are installed underneath earthen berms to allow water to pass underneath the pathways. The multiflow culverts have multiple small diameter outlets rather than a single large outlet to ensure safety and to accommodate the shallow site grades.

In areas of high use, fences, boulders, and gabion baskets are used to create a barrier between play areas and storm infrastructure. Around areas where there is not likely to be extensive ponding or high play activity, boulders and vegetation can be used as a softer barrier.

Plantings are necessary thoughout the swale to both reduce erosion and to improve the ability of water to infiltrate into the ground. These plantings should be hardy, wetland-adapted, and non-toxic species. Appropriate trees include native birches, aspens, and poplars (care should be taken to not plant poplars close to buildings or pavement). Shrubs can include willows, dogwoods, and dwarf birch. Grasses like feather reed grass, Karl Forster grass, and switch grasses also do well in rain gardens and swales.



DRAINAGE + TARMAC AREA

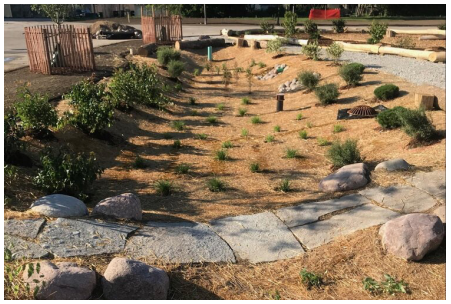
DRAINAGE DESIGN INTENT

DRAINAGE + TARMAC AREA

DRAINAGE ELEMENTS

a. Swale

A swale surrounding the northwest perimeter of the schoolyard will collect the stormwater that drains from the regraded tarmac and grassy areas. This swale will function first to improve infiltration, and in major storm events or during spring melt, direct water towards the existing catch basin.



b. Rain Gardens

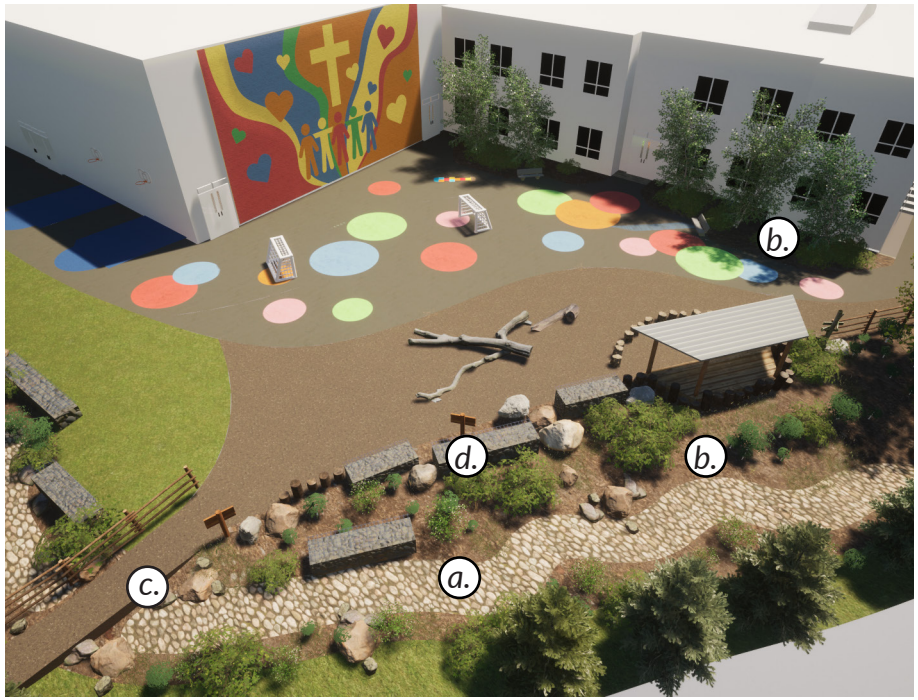
Rain gardens will capture and help manage stormwater throughout the site to reduce the demand on the main swale and beautify the schoolyard.

c. Visible Infrastructure

Stormwater management and ecosystem health will be visible to students through the exposed drainage swale. They will be able to see how water flows towards the swale, how it can be used by plants, how it infiltrates into the ground, and eventually, how it ends up flowing into a city storm drain.

d. Interpretive Signage

Green infrastructure elements are to be accentuated with interpretive signage explaining their greater function in the community ecosystem. This offers visiting community members an understanding of the school's role in stormwater management.



DRAINAGE + TARMAC AREA

DESIGN ELEMENTS

a. Natural Play

Unstructured play areas offer opportunities for imagination and village play. This play helps students learn cooperative roles and develop social understanding. Small logs, branches, canvas scraps, and boulders complement these activities and are cost-effective to resupply or replace.

b. Quiet Spaces

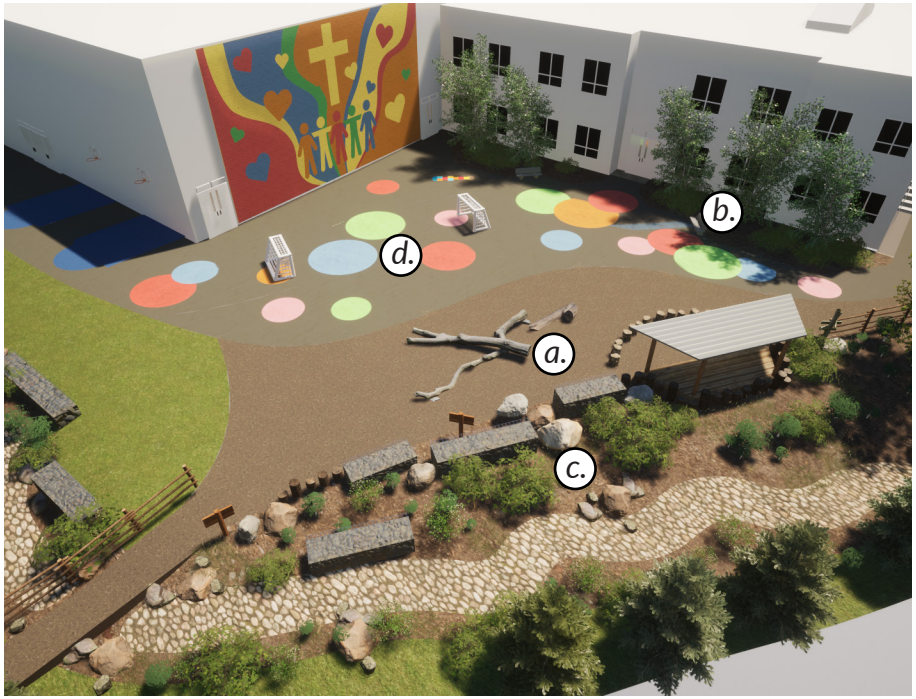
Small tents or other child-scale structures surrounded by natural elements provide respite for students who are feeling overwhelmed, or simply need a quiet place to reflect and have personal time with God.

c. Native Plantings

Bioswales located adjacent to classroom windows planted with tall, water-loving, shade-tolerant trees to provide visual barrier and capture runoff from building.

d. Tarmac Play Area

2 new half-court basketball courts and tarmac games area. Existing tarmac area to be removed and regraded with sports surfacing and asphalt. Opportunity for student involvement in designing and painting game areas and murals.



DRAINAGE + TARMAC AREA

GENERAL CONSTRUCTION SCOPE

A. Site Preparation + Demolition:
i. Clear the designated area of vegetation, debris, and any existing structures or obstacles that may impede construction.
ii. Set up necessary erosion control measures, such as sediment barriers and silt fencing, to prevent soil erosion during construction.

B. Asphalt Removal:
i. Remove the existing asphalt surface using appropriate methods, such as milling, grinding, or excavation, based on site conditions and project requirements.
ii. Properly dispose of the removed asphalt in accordance with local regulations and environmental guidelines.

C. Asphalt Sub-base Preparation:
i. Inspect and evaluate the condition of the sub-base and assess the need for any repairs or improvements.
ii. Perform necessary sub-base preparation, such as grading, compaction, and stabilization, to ensure a stable and uniform foundation for the new asphalt surface. Ensure minimum 2% slope towards swale.

D. New Asphalt Installation:
i. Apply a new layer of hot-mix asphalt (HMA) or other suitable asphalt material according to the specified thickness and design requirements.
ii. Include any necessary markings, such as lines, symbols, or patterns, as required for parking, play areas, or other designated zones.

E. Swale Construction:
i. Excavate the swale according to the approved design and specifications, ensuring proper dimensions, slope, and depth.
ii. Grade the swale to achieve a consistent and uniform slope, allowing for effective water flow and drainage.
iii. Install low profile multiflow culverts at crossing points and cover with earth.

F. Rock Installation:
i. Place geotextile fabric along the bottom and sides of the swale to prevent soil erosion and filter out fine particles.
ii. Install a layer of well-graded and properly sized rocks along the swale, ensuring complete coverage and stability.
iii. Compact the rock lining and apply ROMEX sealant to promote a secure and long-lasting installation.
iv. Install crushed granular rock surfacing and pathways over culverts.

G. Site Furnishings:
i. Install site furnishings including play equipment, gabion baskets, fencing, and seating.

H. Vegetation Establishment:
i. Integrate appropriate vegetation, such as native grasses or plants, within the swale to enhance stability and aesthetics.
ii. Install erosion control blankets or matting, if required, to promote vegetation establishment and prevent erosion.
iii. Construct planting beds adjacent to school building and integrate appropriate trees.

I. Site Restoration:
i. Restore the surrounding area by regrading, reseeding, or replanting as necessary to blend the swale with the existing landscape.
ii. Clean up the construction site, remove any excess materials or debris, and dispose of them properly.

NOTE: This overview is for information purposes only. The actual construction scope will be determined during the detailed design phase and may differ from this overview.