DENVER PUBLIC SCHOOLS

SUSTAINABLE LANDSCAPES MANUAL

FALL 2025

CREDITS

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Biohabitats
Ecology & Mapping

HydroSystems KDI
Irrigation

NEIGHBORHOOD RESILIENCE
Engagement & Funding

A LETTER FROM DPS...

We are proud to share the first Sustainable Landscape Standard & Implementation Plan for Denver Public Schools (DPS)!

This plan is a result of the first-ever DPS Climate Action Plan, which in turn was developed in response to **student-driven** climate advocacy.

We intend for this plan to be used for projects across the district to **transform landscapes** into spaces that are environmentally, socially, and financially sustainable and beneficial, while also being tailored to Denver's unique climate, soil types, and growing conditions.

We partnered with Superbloom to develop a standard for our region and cater to the demands of high use play areas and community spaces.

This plan is for students, staff, and the community. **We can't wait to grow with you!**

- Denver Public Schools
Chris Woodburn, *Sustainability Program Manager*
Lindsay Weber, *Senior Analyst, Sustainability Team*
Mark Hurd, *Grounds Manager*

SUSTAINABLE LANDSCAPES PLAN

DOCUMENTS

This Plan is comprised of several component documents:

Sustainable Landscapes Manual
Public Document

This manual is a step-by-step guide to help Denver Public Schools transform lawns into resilient, water-smart landscapes. With simple tools for choosing plants, improving soil, setting up irrigation, and caring for new plantings, it makes it easy to create greener schoolyards that save water, support learning, and bring nature back to campus.

Maintenance Manual
Public Document

This manual provides Denver Public Schools with clear, practical guidance for maintaining sustainable landscapes across school sites. It explains how to care for new plantings during the critical establishment phase (0–3 years) and how to transition into long-term maintenance (3+ years). Organized by season, it outlines tasks for watering, pruning, weeding, and monitoring plant health, while also offering troubleshooting tips for irrigation and plant replacement. The appendix includes resources like weed identification guides, a maintenance flow chart, and links to external references that support pollinator health and sustainable practices.

Public Outreach Strategy
Internal DPS Document

This manual creates a plan for engaging with students, staff and the community through both landscape design, and installation phases. Part 3 of the manual describes opportunities for long-term student engagement, including methods of connecting students to and sparking on-going interest in the land, plants, soil and water.

The 30 Sites Assessment
Internal DPS Document

Thirty (30) Denver Public School campuses were selected by DPS based on factors including size of site, equity index, known opportunities, and representation of all grade levels from across the entire district.

This manual presents an analysis of thirty DPS schools, focusing on opportunities to replace high-maintenance lawn areas with low-water-use planting. The evaluation also considers heat island severity, soil conditions, and the status of existing irrigation systems.

Implementation & Funding
Internal DPS Document

This document acts as a resource for Denver Public Schools, highlighting possible paths for project funding.

Pilot Projects
Internal DPS Document

Three school campuses were selected by DPS to act as Pilot Projects, chosen for their differences and for that school's potential for engaging with the public about turf conversion projects.

The Project Team developed a conceptual drawing package for all three schools, suggesting how proposed planting can be quantified, and irrigation addressed.

EXECUTIVE SUMMARY

This is for YOU!

This manual is the first part in a series of documents (see pages 4-5) developed for students, staff, and members of the Denver Public Schools (DPS) community, collectively referred to as the DPS Sustainable Landscape Plan. It is meant to act both as a guide and an action plan, enabling school members at multiple levels to dream up, visualize, and ultimately realize sustainable landscapes at schools.

The Challenge

Situated on the Great Plains, Denver's landscapes are characterized by an arid climate and extreme weather patterns. As western cities experience rapid population growth, water scarcity has emerged as one of the most pressing issues, compounded by increasing drought severity and rising temperatures. As the second-largest landowner in the city, the role of DPS in shaping the future of sustainable landscaping is critical. As stewards of over 2,000 square acres of school grounds, DPS has the unique opportunity to lead the way in transforming public landscapes.

In response to these challenges, the State of Colorado recently passed legislation (C.R.S § 37-99-102) banning the installation of "non-essential" turf, setting the stage for significant landscape transformation projects across the state, including within DPS. The DPS Sustainable Landscape Plan aligns with this law and other major citywide initiatives, such as the Denver City/County Building Landscape Transformation, the Pollinator Trail, and the Colorado Water Plan. This project provides an incredible opportunity for DPS to set a new model for public landscape design, transforming school grounds into resilient, water-efficient ecosystems that reflect Denver's ecological needs and priorities.

Defining Functional vs. Nonfunctional Turf:

While water conservation is a critical component of the Sustainable Landscape Manual, we recognize the value of strategically located turf lawn. Sports fields, recreation areas, and active-use spaces—essential for student health and fitness—will remain untouched. Our focus is on transforming underutilized turf areas—about 28% of lawns across school grounds—that don't serve a functional or recreational purpose. By converting these non-essential areas, we can create more sustainable, water-efficient landscapes while preserving spaces for active recreation.

Project Goals

The DPS Sustainable Landscapes Manual focuses on three key goals:

1. Water Conservation

It aims to reduce district water use by 15% from the 2021 baseline. We estimate that an average of 6 million gallons of water are used to irrigate turf lawn each year at each DPS campus. By using advanced irrigation technology and drought-tolerant plants, we plan to cut supplemental irrigation needs to approximately 10 gallons per square foot per year, compared to the current average approximately 28 gallons per square foot per year. This will help conserve water and set a new standard for sustainable landscapes across DPS.

2. Climate-Adapted Landscape Design

The recommendations focus on creating resilient, climate-adapted landscapes using native plants that thrive in Colorado's environment. These landscapes will support biodiversity, require minimal irrigation, and provide students with hands-on learning about ecosystems. By prioritizing sustainability, we aim to reduce water use and enhance the beauty and ecological health of school grounds.

3. Student Education & Community Outreach

The plan creates opportunities for students to engage in hands-on learning about sustainable landscapes, connecting classroom lessons to real-world environmental issues. These efforts also aim to engage families and the community, raising awareness of sustainability through targeted outreach in school neighborhoods and citywide initiatives. Programs like the *Summer Adaptation Academy* or *DPS Students for Climate Action* empower students to lead sustainability projects. Ultimately, the project will serve as a model for the city, inspiring schools and homes across Denver to adopt eco-friendly practices.

Strategies for Long-Term Success

Converting turfgrass into sustainable landscapes is a complex process that requires careful planning and execution. This plan includes strategies for funding, installation, and maintenance to ensure the long-term success and sustainability of these landscapes. Our goal is to create spaces that continue to be enjoyed and valued by the community for years to come.

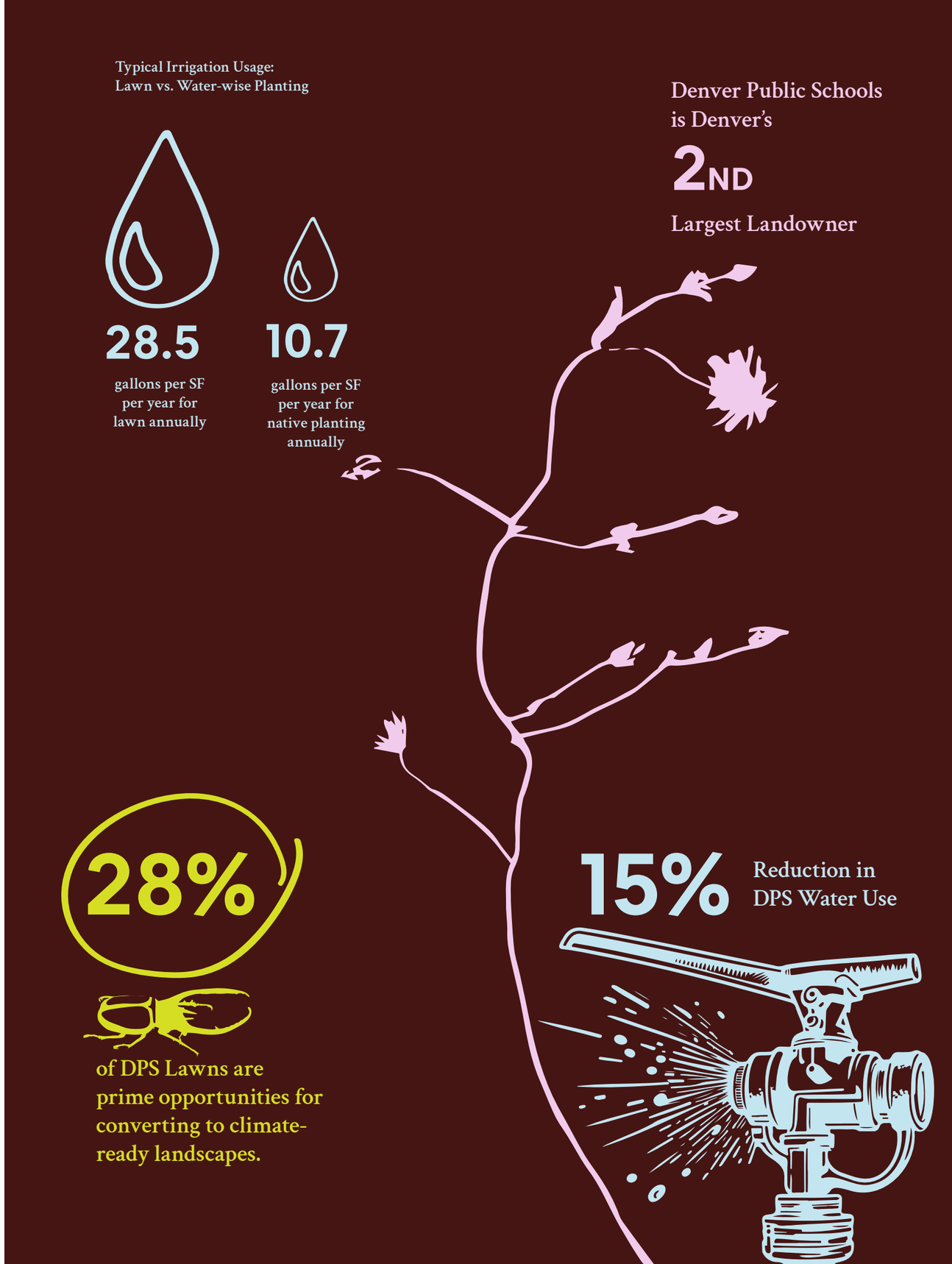

Image Credit: Ava Hiller

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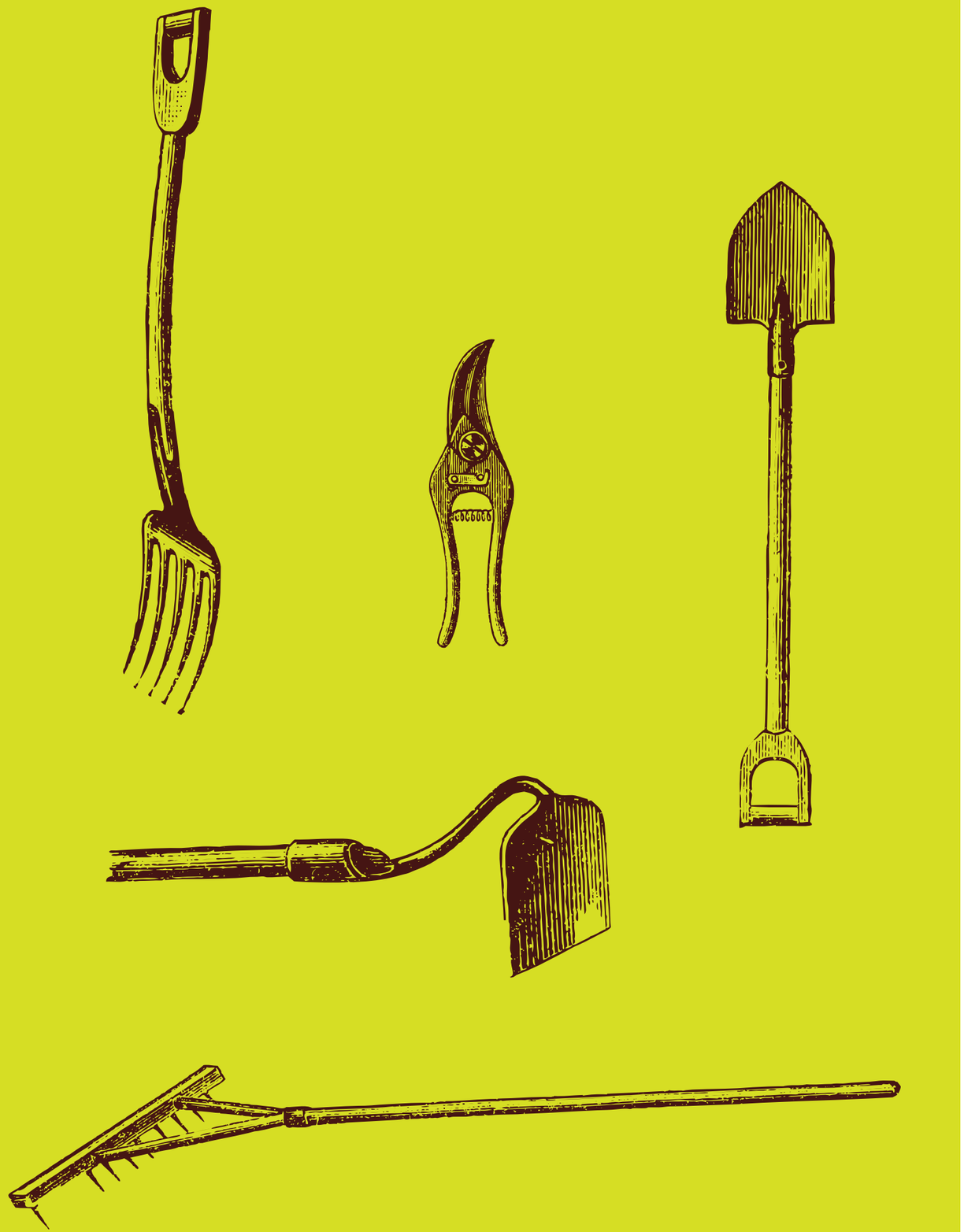


IT'S TIME TO DIG IN, GET OUR HANDS DIRTY, AND MAKE OUR SCHOOLS A LITTLE **WILDER**. LET'S GROW A BETTER FUTURE FOR DENVER, ONE SCHOOL YARD AT A TIME!

INTRODUCTION

Cultivating Future Stewards: Sustainable Landscapes for Denver Public Schools

Denver is already feeling the heat—literally! With hotter days and droughts impacting our schools, it's time to rethink how we use our outdoor spaces. The Denver Public Schools (DPS) Sustainable Landscapes Manual outlines how we can positively impact over 2,000 acres of school grounds. By introducing students to Colorado's native landscapes—like our iconic prairies and wildflower meadows—we can provide hands-on science opportunities and engage the next generation of environmental stewards by connecting classroom learning to the outside world.

This Sustainable Landscapes Plan is about creating sustainable, educational environments that are efficient with precious resources like water and money. We're transforming underused, water-intensive lawns into low-water-use meadows that are as beautiful as they are planet-friendly. The plan also includes cost estimates and water metrics to track progress and demonstrate how cost-effective these changes will be for the DPS community.

Building on the success of the DPS Climate Action Plan, and developed in collaboration with the Landscape Task Force, this initiative aligns with the larger community goal of creating a greener, cooler Denver. It's not just about sustainability—it's about teaching students, families, and the wider community why these changes matter.

SUSTAINABLE LANDSCAPES

How Do We Define Sustainability in This Plan?

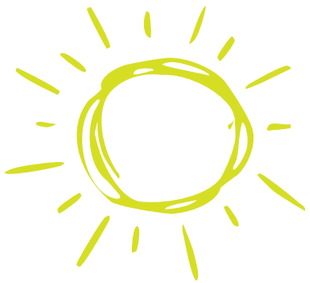
What Does Success Look Like?

We define sustainability through a set of key criteria designed to ensure the project's long-term success and positive community impact. These goals guide our evaluation, design, and implementation:

#1 

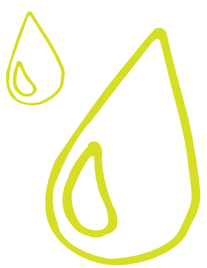
Cost-Benefit Analysis:

Balancing upfront costs with long-term savings. This includes both financial considerations and environmental benefits such as lower maintenance costs and reduced water usage.

#2 

Heat Island Reduction:

Designing landscapes that help cool down the environment around schools, making outdoor spaces more comfortable for students and staff.

#3 

Water Efficiency :

Conserving water by selecting drought-tolerant plants and implementing efficient irrigation systems, reducing demand in a changing climate.

#4 

Biodiversity & Pollinator Support:

Creating habitats that connect ecosystems and support pollinator populations, like bees and butterflies, that are essential to our local ecology.

#5 

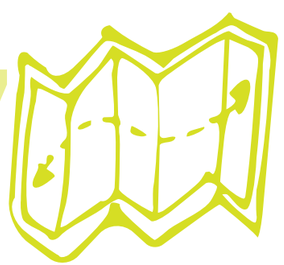
Equity & Access:

Prioritizing communities that are most in need of green spaces, particularly areas historically lacking investment in green infrastructure. By transforming neglected or underutilized schoolyards, we can ensure that all students and families have access to healthy, vibrant outdoor spaces.

#6 

Schools as Community Hubs:

Measuring how school landscapes function as neighborhood assets by tracking community use, partnerships, and programming that extend benefits beyond students to families and local residents.

#7 

Scale & Size of Green Spaces:

Designing landscapes that are appropriately sized and distributed, with an emphasis on maximizing both environmental and educational benefits at each school site.

CONTEXT

Denver Public Schools serves a diverse community across a wide range of facilities—from historic buildings over 100 years old to brand-new campuses. Many of these schools were built before the advent of modern technology and rise of climate concerns, leaving their landscapes and irrigation systems outdated. As Denver continues to face increasing heat, drought, and water scarcity, the need for water-efficient landscapes has never been more urgent. With over 90,000 students and 200 schools, DPS has a unique opportunity to lead in creating sustainable, water-efficient school landscapes through the new Sustainable Landscapes Plan. This opportunity extends beyond efficiency—it's a chance to transform underused lawns, barren grounds, and ordinary entrances into vibrant, functional landscapes that welcome students, support pollinators, and serve as living classrooms.

The Best Management Practices (BMPs) contained in this manual are designed to improve resilience to climate change and include: turf conversion, installing updated irrigation systems with optimized water conservation technology, standards for enhancing tree health, and adapting to different soil types. This action-oriented manual provides frameworks and design templates to create adaptable, water-wise, and sustainable outdoor spaces. It is fundamentally aligned with the DPS Climate Action Plan, which seeks to conserve water and foster healthier environments for students and families as we educate the next generation about climate science and sustainable landscapes.

OPPORTUNITY:
Transform school entrances into welcoming spaces, both to students and pollinators.

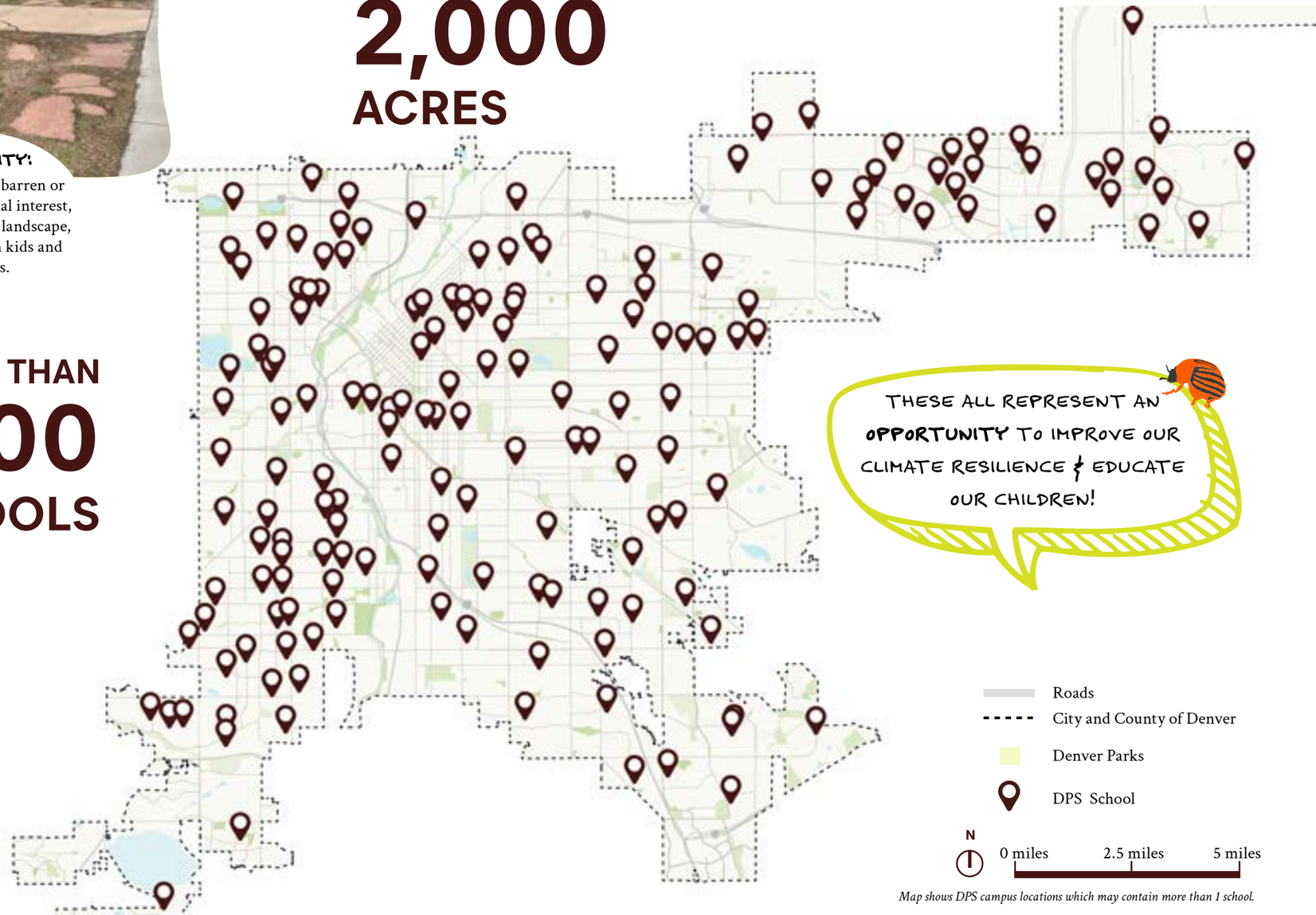
OPPORTUNITY:
Turn earth that is barren or dry, with little visual interest, into a rich, vibrant landscape, engaging for both kids and pollinators.

OPPORTUNITY:
Turn vast expanses of lawn that are highly watered and mowed, but not frequently used by students, into low-water use planted areas that can be used to educate our students and better serve the land.

OPPORTUNITY:
Restore health and vibrancy to spaces dominated by weeds or depleted soils.

OVER 2,000 ACRES

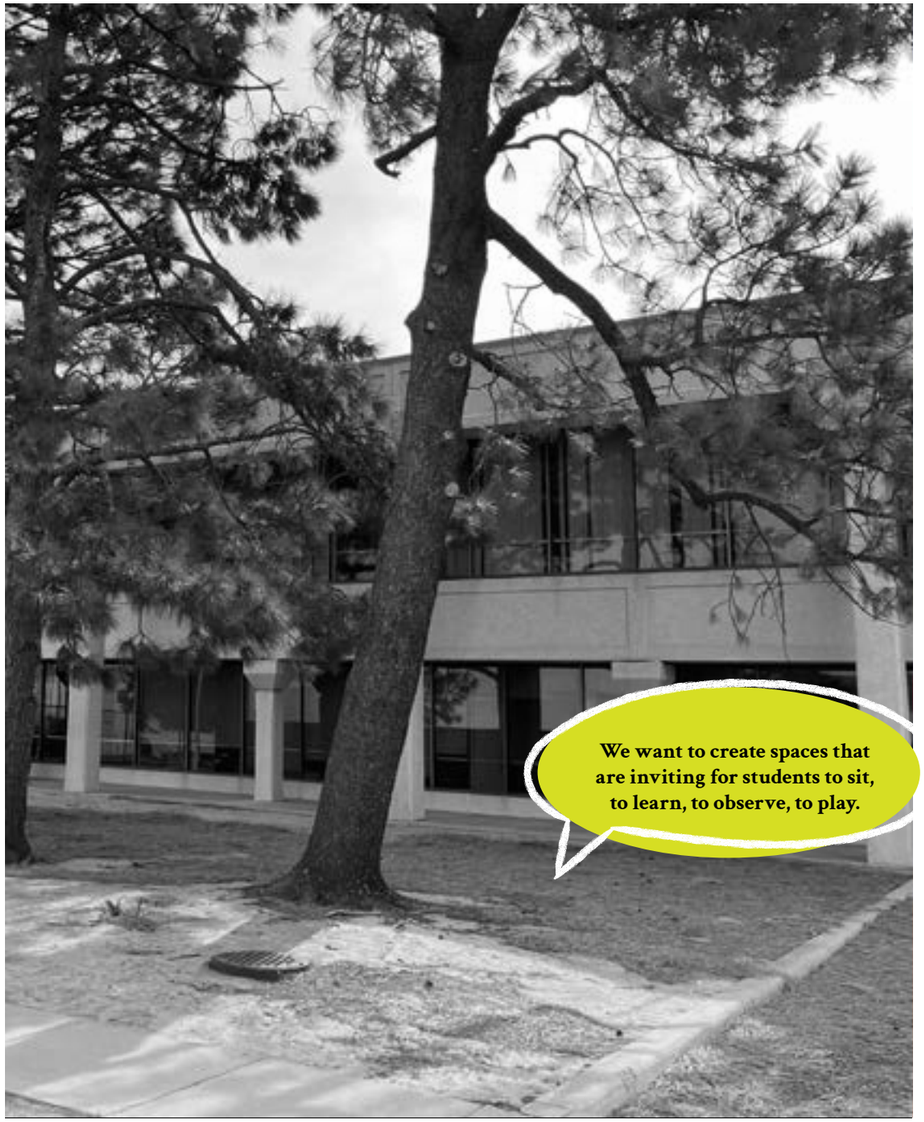
MORE THAN 200 SCHOOLS



Map shows DPS campus locations which may contain more than 1 school.

EXAMPLE AREAS OF OPPORTUNITY

Bruce Randolph High School
Clayton Neighborhood



Northeast Early College
Montbello / Green Valley Ranch Neighborhood

HOW DO WE GET THERE?

A Road Map

START HERE

01 Define Project Goals

Project goals shape the direction of your planting—are you aiming to save water, support pollinators, reduce mowing, or make use of available funding?

Determine:
Who is responsible for the project—for the design, the installation, the funding, the long-term care?

Develop:
Develop the beginnings of your landscape plan. This can be refined later, but start high-level, marking what elements you want to include and where they will go.

02 Evaluate the Existing Landscape

The sun exposure on a site changes significantly throughout the day, and throughout the year, and understanding how nearby buildings, structures and trees shade a site offers critical information as it relates to developing the proper plant palette.

03 Test the Soil

Soil health is critical for plant growth. Are the soil nutrients and structure ready for planting, or do we need to give them a little boost?

Determine how your site is currently used by students, staff, and families:

What is going on in and around the area? Is it near the front of the school with lots of foot traffic, or behind the school where students rarely walk? Do students enjoy using a certain area for lunch or for play? Is it near a road or entrance drive?

04 Assess Irrigation Needs

The contractor will need to visit the site to assess the existing irrigation system and verify what, if anything can be salvaged or reused.

Think about Amenities:
Will you be adding any trees? Would a walking path or outdoor sitting area make sense in this area?

Community Engagement: Part 1
As you go through the design process, include the community: gather ideas from many voices. Use these to inform the design.
Remember: design is an iterative process. You will likely go through many drafts or versions of your plan, making it stronger with each revision.

05 Select Your Plant Palette & Refine Your Plan

Using the information you gathered on the existing conditions of your site, the soil test results, your observations of how the site is currently used, and your vision for the landscape, select a plant palette. (*Please refer to Part 2 of the Manual, Select your Plant Palette & Refine Your Plan, Pg. 33.)*

Community Engagement: Part 2
Before installation begins, notify the public so that the neighborhood knows what is happening and can help support project efforts.

Determine:
Who will be responsible for installing the project?

Hire a contractor or find volunteer support.

06 Install Seeds, Plants, & Mulch

Now it's time to plant, but how? Should you use seeds, live plants, or a mix of both to get the best results for your project? What is the best type of mulch to use?

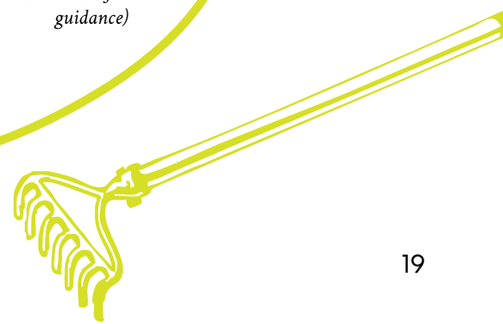
Determine:
How will the installation be supported during the 1-3 year establishment period?

What is the short-term plan for getting plants established, for managing weeds, monitoring irrigation, and overall well-being of the plants?

07 Maintain

Now it's time to take care of the new landscape you've installed. This may be the hardest part. How will you support and maintain the installation? What tools will you use, how often will you check, and what will you look for?
(Please refer to the Maintenance Manual Document for guidance)

Community Engagement: Part 3
Continue to learn about your new landscape together through activities, educational exercises, and exploration.

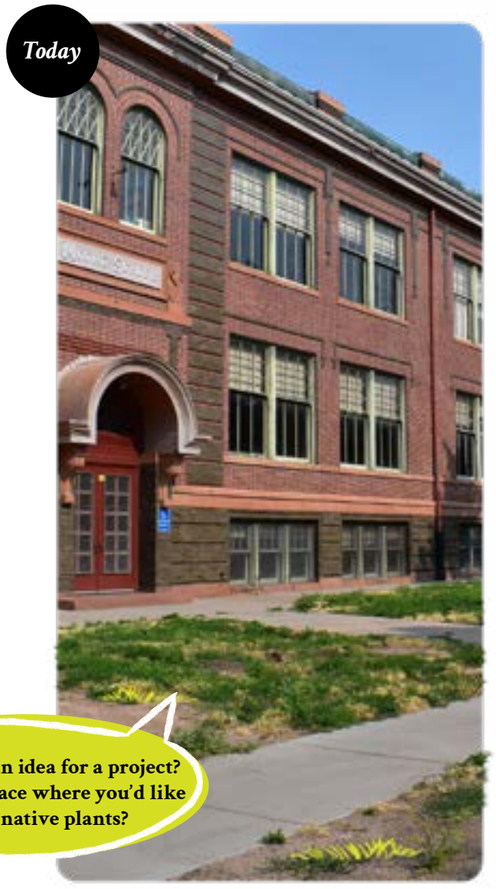


STEPS TO A NEW PROJECT...

This section is for those who would like to pursue a landscape project on a DPS campus.

The process of not only building a new landscape, but transforming an existing one, can be daunting. It is a complex process! Sometimes it is difficult to know where to start.

These pages illustrate the typical sequencing of a landscape project.



What do you see?
You may find that the landscape at your school needs a little love and attention.

The soil may look dry, there may be lots of weeds. Or you may have lush green lawn but know that students aren't using it to play on and it uses too much water.

Develop a project idea!

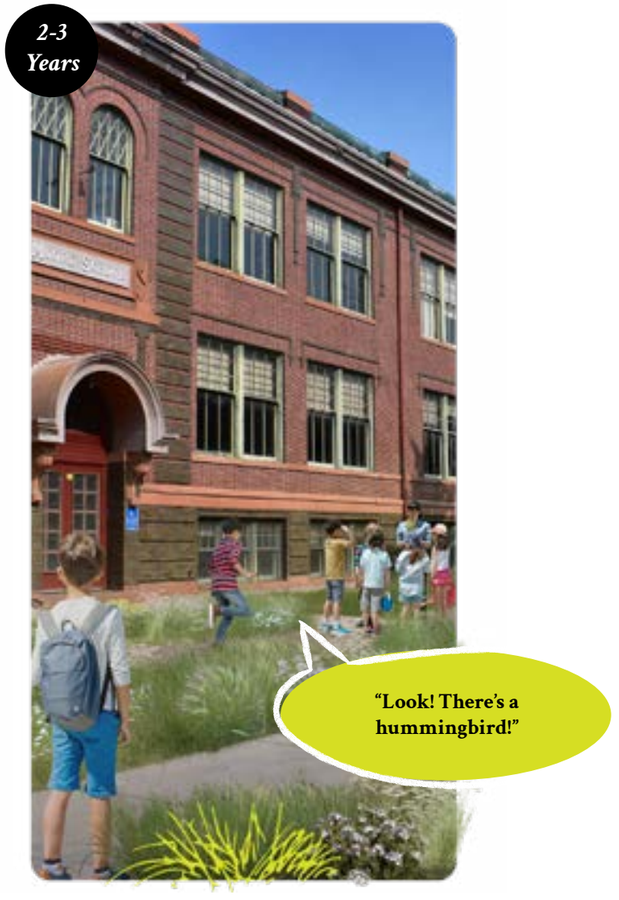
Early steps
Get approval for the project idea from the School Administrator and your Facility Manger. Refer to the DPS First Call Communications Handbook on pages 15-23.

Submit a Facility Modification Request and include any maps or designs.

Once you have approval, or have made any changes that need to be made to the project and they are approved, the project can move forward.

Design & Install
You've gained an understanding of your site. You've prepared the soil and updated your irrigation system.

You've selected the plant palette that fits your landscape area. Plants have been purchased and it's time to put them in the ground!



Care for your landscape & talk about it!
Now it's time for learning about your new plants and noticing when they need some help! Learn what common weeds look like and be able to tell the difference between those new shoots and the plants you planted. Make sure your plants are getting enough water, especially in those early days, weeks and months. They'll need a little extra.

Tell your friends about your project, tell your family, tell your neighbors! This land is for all of us.

PART 1:

GETTING STARTED

01. **Define Project Goals**

02. **Evaluate the Existing Landscape**

03. **Test the Soil**

04. **Assess Irrigation Needs**

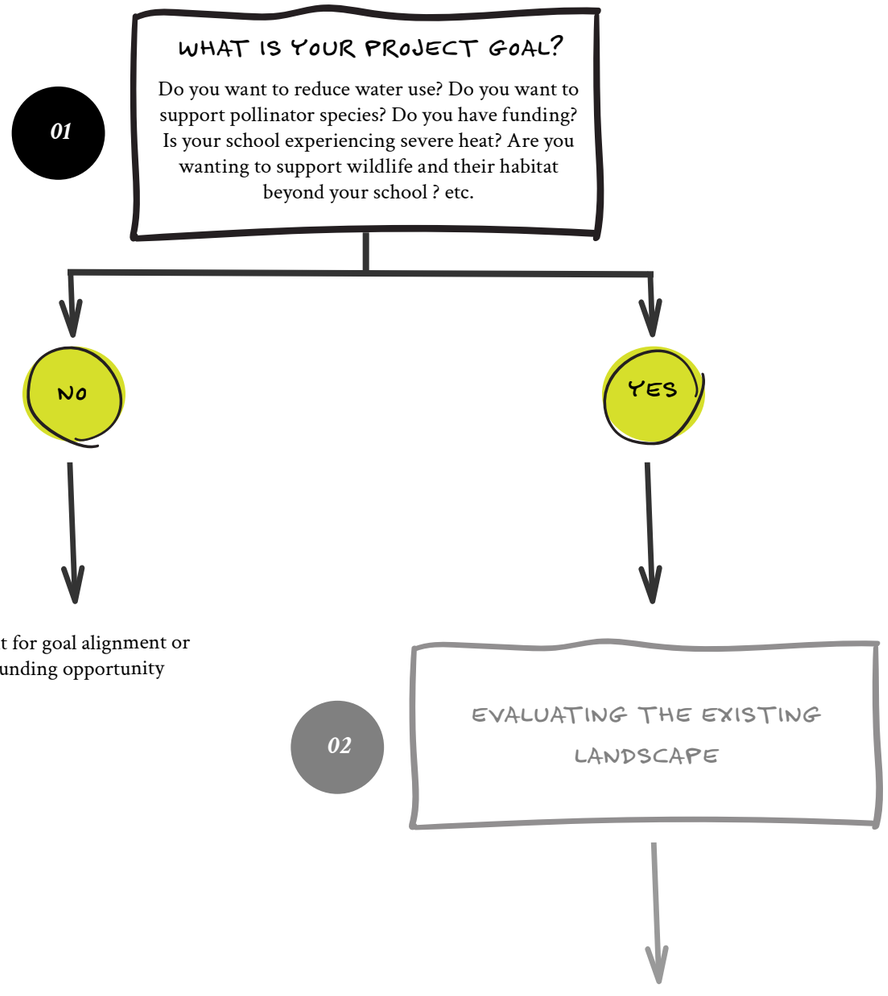
This section will show you how to:

The DPS Sustainable Landscapes Manual is designed to help everyone—students, staff, teachers, principals, and facilities managers—create beautiful, water-efficient school grounds using native plants. By transforming traditional turf into low-water landscapes, we're not just conserving water; we're also creating outdoor spaces that are more resilient, easier to maintain, and better for the environment. This guide shows you how you can be part of this exciting change, by planting native species, learning new maintenance techniques, or engaging with students to explore the benefits of sustainable landscaping.

DEFINE PROJECT GOALS

Are you ready to begin?

Clarifying your project goals early on will help guide design choices and prioritize resources. Are you aiming to reduce water use, support pollinator habitat, increase biodiversity, or cut down on maintenance? Do you have funding or staff capacity to support more intensive installation or care? Identifying your primary goals will help match the right planting strategy to your site and ensure the project delivers meaningful, lasting benefits.



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A Support Local Pollinators

Replacing turf grass with drought-tolerant planting will increase the number of flowering plants, benefiting local pollinators.

B Create Moments to Learn

Educational opportunities can be created as an integral part of a turf conversion project. Leveraging the landscape as a platform for learning, it can become a living source of study and inspiration.

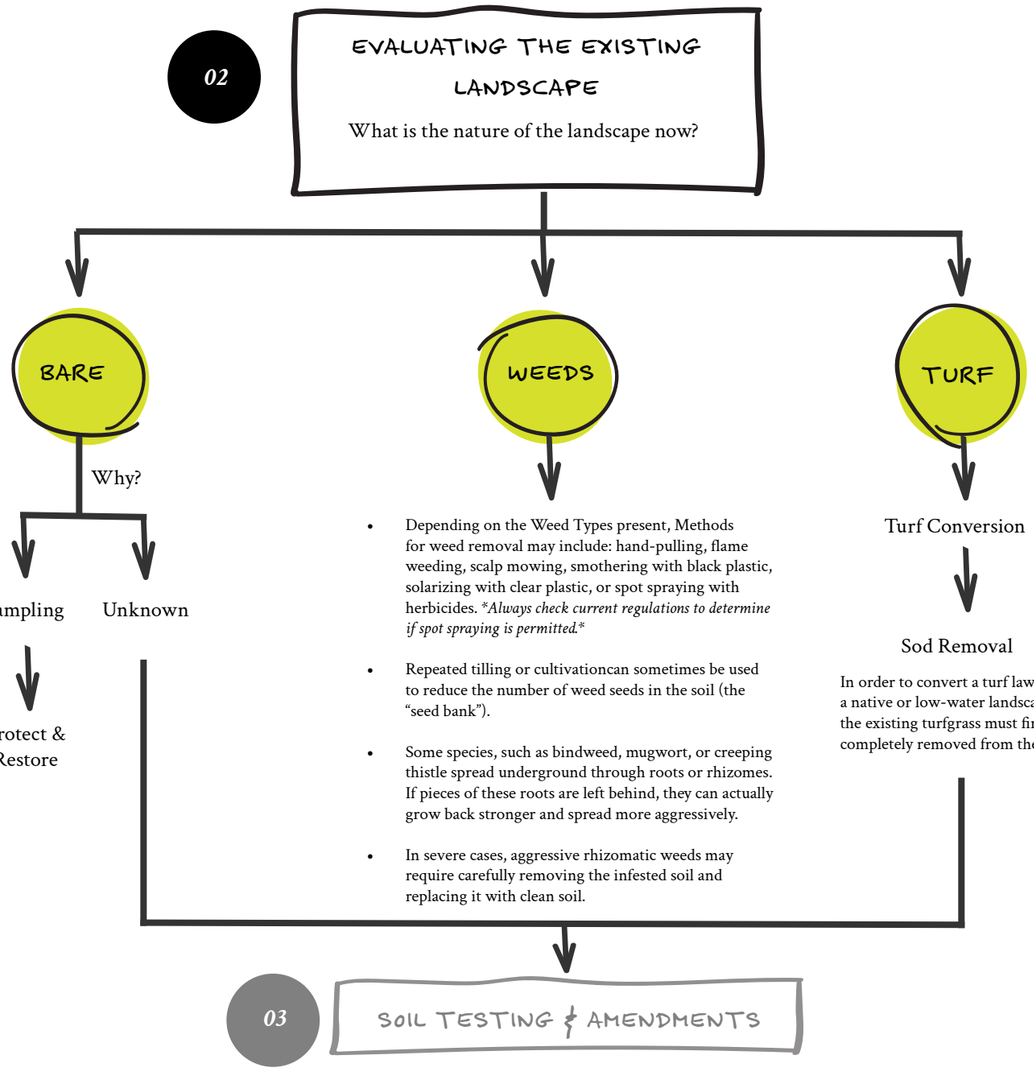
C Reduce Water Use

Removing existing, water-thirsty turf grass and replacing it with drought-tolerant plants can significantly reduce water use, especially over the long-term.

EVALUATE THE EXISTING LANDSCAPE

The Existing Landscape:

Before planting, assess the existing landscape to understand what you're working with. Areas may be mostly bare soil. This condition is typically the easiest to convert and requires minimal prep. Weedy areas may need more intensive site preparation in order to reduce competition and prevent regrowth. Turf areas require a strategy for removal or suppression before planting can begin. Identifying these conditions early will help determine the level of effort needed and ensure a successful, long-lasting planting.



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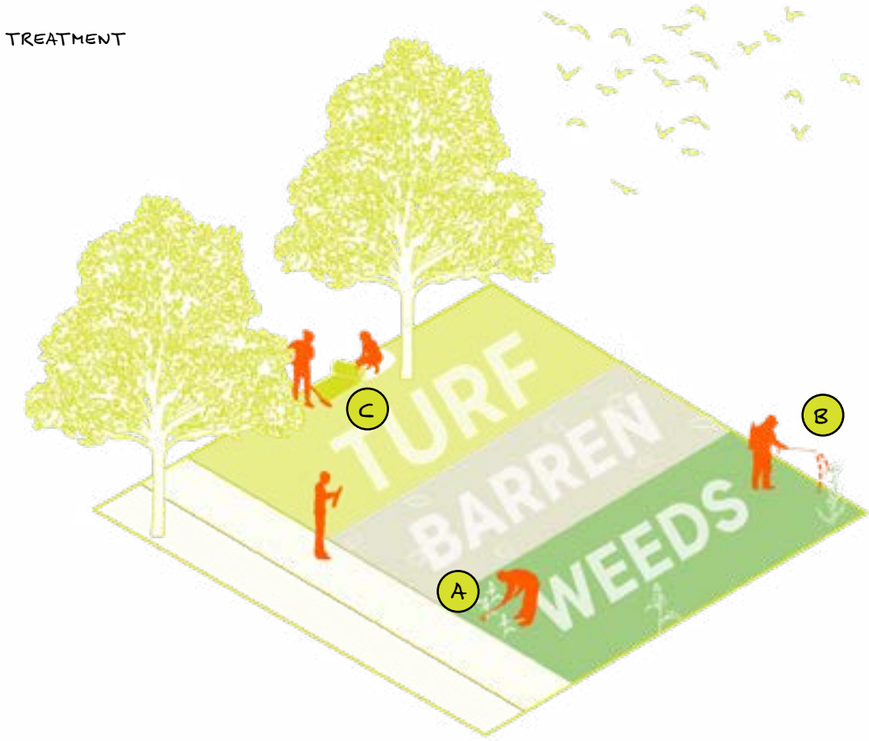
Click Play Icon to Learn More:

- TURF REMOVAL
- WEED TREATMENT



A Are There LOTS of Weeds?

Determining the types of weeds present and determining how many (if there are a few spotted around, or if weeds are the main things growing), will help you determine the best approach for removing them.

See "B" for recommendations.

B What type of Weed Treatment is Best?

Consider where the area is that needs to be weeded. Is it a small area near student use? Pull weeds by hand or use a long-handled weeding tool for greater efficiency.

Is the area much larger and away from student use? Apply spot treatment of herbicide. Be aware that any herbicide use will harm native plants if it comes into contact with them.

C Removing Existing Turf

Consider the existing condition of the turf grass. Is it thick and mostly uniform? Removal of sod using a sod cutter may be best.

Is the existing turf grass mostly patchy, mixed with weeds and bare earth? Removal of sod by smothering or sheet mulching (using cardboard and compost) may be best.

Is the turf grass by a tree? Remove by hand.Take the sod you removed to the local compost.

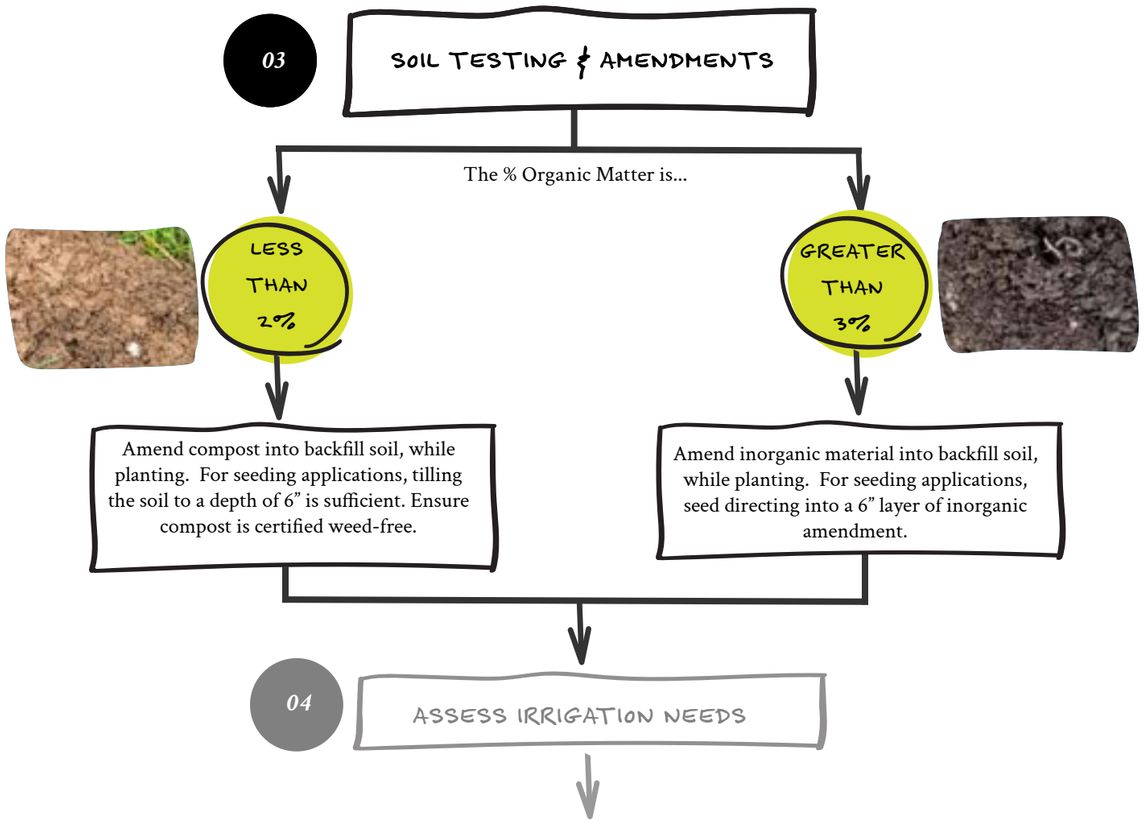
TEST THE SOIL

The Importance of Soil Science for Water-Efficient Landscapes

Soil is the foundation of every healthy landscape. It's more than just dirt—it's a living, dynamic environment that plays a crucial role in how well plants thrive and how efficiently water is used. When we take the time to understand and improve our soil, we create landscapes that need less water, are easier to maintain, and support healthier plants overall.

The right soil helps water move efficiently through the soil profile, making the most of every drop. Healthy, well-structured soil can absorb and hold water better, making it available for the plant species we are trying to establish and maintain, reducing the need for frequent irrigation. It allows plant roots to grow deeper and stronger, which means they're better at accessing water and nutrients on their own. This results in plants that are more resilient to drought and require less maintenance.

Regenerating the soil by improving its structure and adding organic matter and/or other soil amendments may take extra effort upfront, but it pays off in the long run. Healthy soil leads to better water retention, less evaporation, and fewer problems with runoff, all of which help conserve water. Plus, when plants have the nutrients and environment they need, they grow stronger and help them out-compete weedy species, reducing the need for pesticides and fertilizers. This creates a low-maintenance, sustainable landscape that benefits both the environment and your time.



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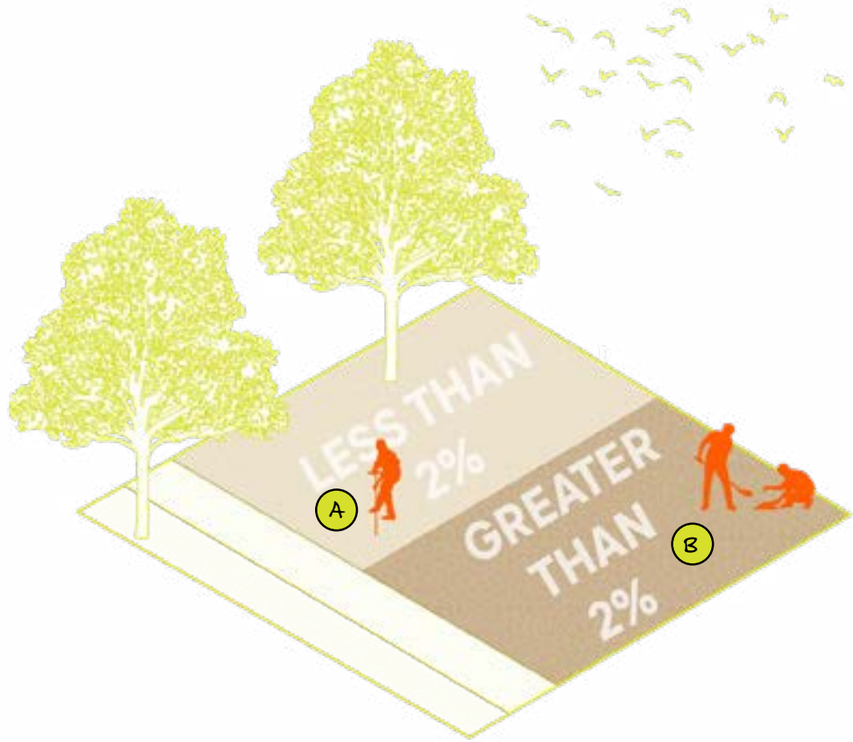
Click Icon to Learn More:

- CSU: SOIL TESTING LAB
- HOW TO COLLECT SOIL SAMPLES



A Utilize Extension Services!

Consult local extension services for expert guidance on plant selection, irrigation practices, and soil health to ensure a successful, low-water landscape.

B How to Collect Soil Samples

Take soil samples from multiple areas of the site, following recommended depths, and send them to a lab or extension office for analysis to guide soil amendments and planting decisions.

ASSESS IRRIGATION NEEDS

In Colorado, irrigation plays a critical role in the successful establishment of any landscape, especially in the first few years. While we aim to design landscapes that are native or low-water-use, it's essential to support plant growth with supplemental watering during the establishment period. Typically, after 2-3 years of establishment, these landscapes should require little to no irrigation during average rainfall years. The goal is to create self-sustaining ecosystems that thrive with minimal water use, but the irrigation system will remain in place for times when extra water is needed, such as during drought years or dry spells. By using efficient irrigation practices, we can help reduce water waste while ensuring our landscapes are resilient, healthy, and sustainable for the long term.

04

IRRIGATION

Design the irrigation system with low-volume drip for planting beds and trees, efficient spray heads for turf to avoid overspray, and water-saving features such as check valves, pressure regulators, and controllers for optimal water use.

CHECK SYSTEM PARTS

- Tap *(works? right size & pressure? backflow age?)*
- Mainline *(works? right size?)*
- Wires *(work? enough wires?)*

Re-Use

Fix → **REPLACE OLD CONTROLLER**

UNDERSTAND HYDROZONES

Keep drip separate

Group by landscape type

Max 3 Valves (80 GPM)

RULES!

1. Spray zones = matched heads + head-to-head
2. No overhead spray in small areas, peninsulas, islands, entryways
3. Pop-ups need check valve + regulator + matched nozzle

05

SELECT YOUR PLANT PALETTE & REFINE YOUR PLAN

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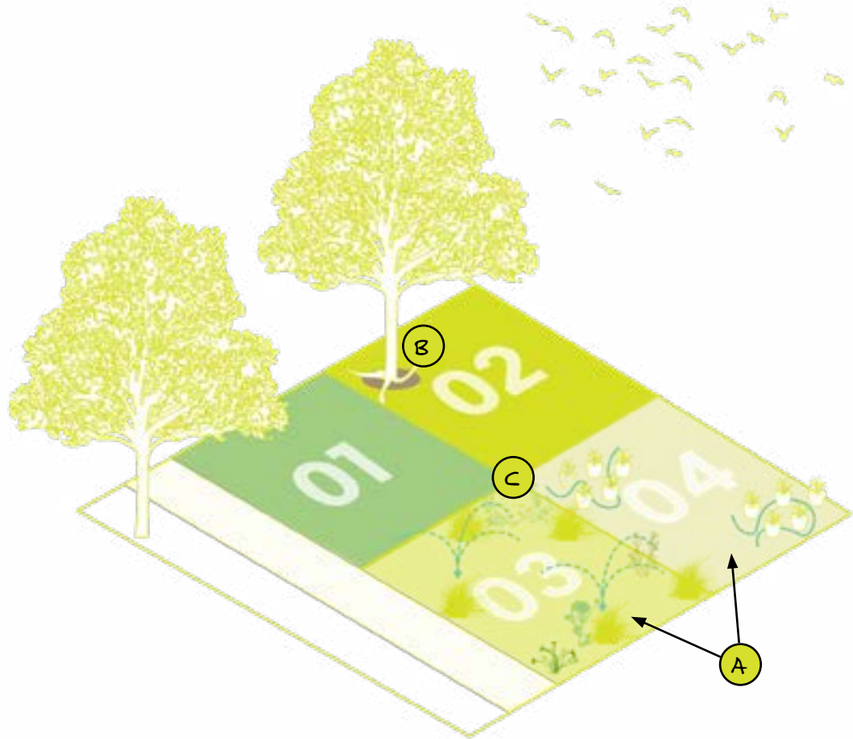
Click Icon to Learn More:

- HOW TO INSPECT AN IRRIGATION SYSTEM
- CSU WATER-WISE LANDSCAPE PLANNING WITH DENVER WATER



A What is the Watering Intent?

Spray = seeded area
Drip = container plants

B Protecting Trees During Installation

Hand dig around the tree's root systems.

C What is a Hydrozone?

A landscape design practice of grouping plants with similar water needs together. This can also be related to the amount of sun or shade an area receives.

PART 2 :

LET'S GET PLANTING !

05. **Select your Plant Palette & Refine Your Plan**

06. **Install Seeds, Plants, & Mulch**

This section will show you how to:

As part of this manual, we developed recommended plant palettes for areas typically seen on school campuses: turf lawn planting directly adjacent to the main entrance, or near the front of the building and highly visible, or at the edges of campuses and not frequently used or seen.

To account for varied site conditions, the palettes are categorized both by site area and by sun or shade conditions.

The following pages describe the categorizations in more detail, how to apply these to various areas of your school and how to assess site conditions that would impact plant success such as sunny or shady environments.

SELECT YOUR PLANT PALETTE & REFINE YOUR PLAN

PART A

The 6 Plant Palettes:

The following plant palettes offer ready-to-use examples for a variety of site conditions across DPS campuses. Each palette includes a scaled 20' x 20' layout, showing plant quantities and recommended spatial arrangements to guide installation. Designed for simplicity and adaptability, these palettes combine container-grown plants with seeded areas to balance immediate impact with long-term resilience and cost-effectiveness.

While each layout is site-informed, they are meant to be flexible templates—easily adapted to different school grounds while following core principles of sustainability, density, seasonal interest, and ease of maintenance.

The following pages will walk you through the steps needed to determine which of these palettes you should use. Refer to the Appendix for detailed species lists by palette.

PRIMARY ENTRANCE

Areas designated as Primary Entrance are planting areas closest to the main entry point of the school. These entrances, and the landscape directly surrounding them, are the most visible and most frequently walked. This is where we'll invest the most.
Plant material will be larger for greater initial impact.

HIGH VISIBILITY

These are areas generally towards the front of the building, but not closest to the front door. They may be farther away from the entrance, closer to the street, or adjacent to other entrances that are not primary.

UNDERUTILIZED OPEN SPACE

Spaces frequently at the back of a school, or farther away from entrances, where landscape areas are rarely seen or used. Plant palettes will be made entirely of seed mixes to reduce cost.

PARKING ISLANDS

Smaller areas of planting within parking lots that do not currently have successful living material.

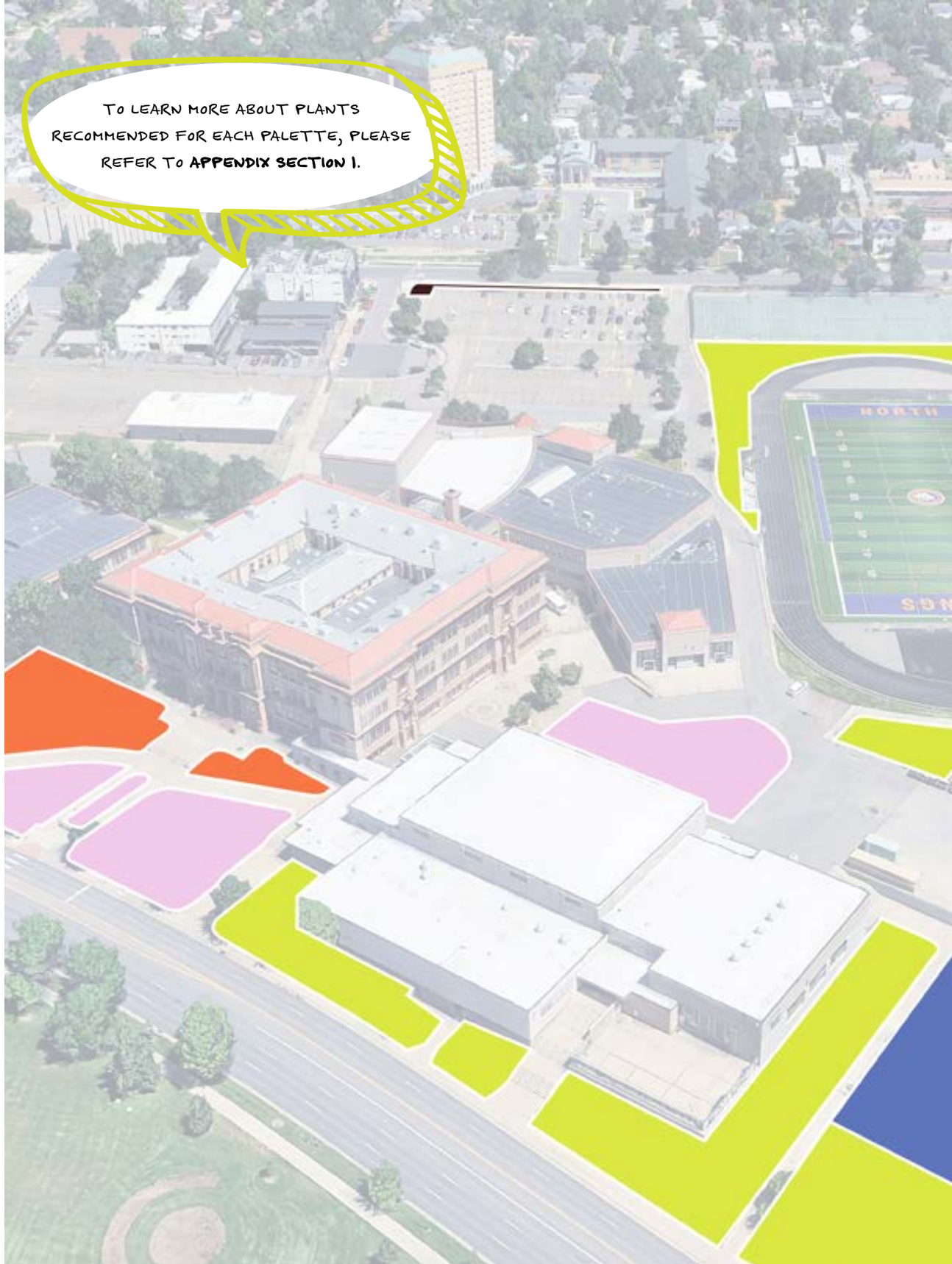
RIGHT-OF-WAYS

Areas owned by the City but maintained by DPS.
Normally the perimeters of the school along the street.

FUNCTIONAL TURF

Areas of green lawn that are currently being used by students and staff: for sports, for games, for gathering, for lunch.

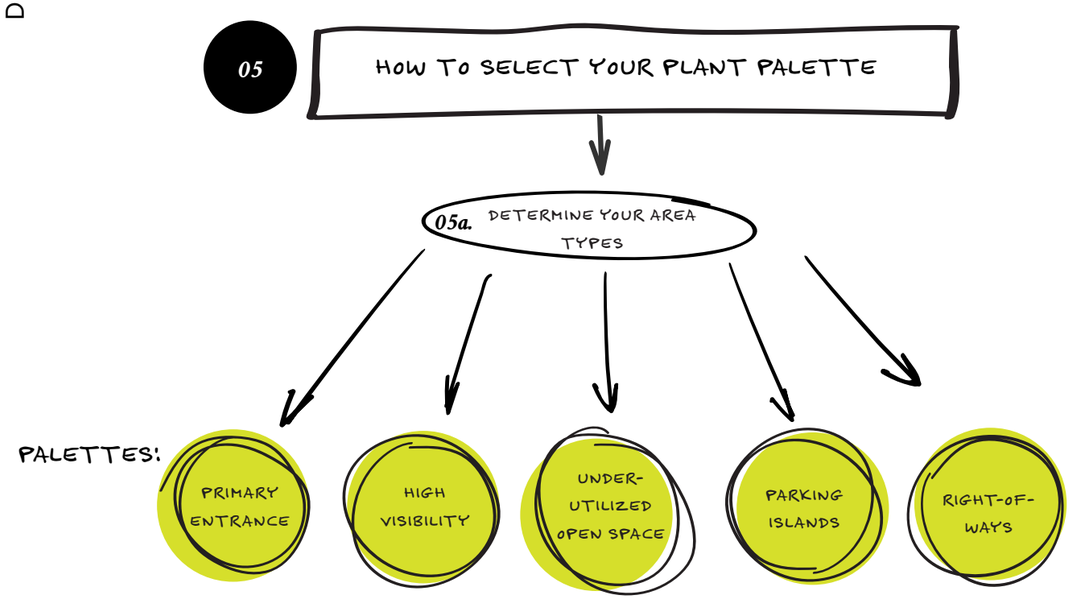
Continue to page 36



SELECT YOUR PLANT PALETTE & REFINE YOUR PLAN

PART B

Area Types:
When selecting planting areas, consider how each space functions and how it will be experienced. **Primary entrances** are high-traffic zones that create a first impression: these areas will use only container plants for an immediate, polished look. **High-visibility areas**, such as walkways or gathering spaces, benefit from a strong visual presence but can incorporate a mix of container and seeded plantings. **Underutilized open spaces** present opportunities to replace low-use turf with low-maintenance, ecologically rich plantings. **Parking lot islands** can be transformed into green infrastructure that softens pavement, absorbs water, and adds shade. Use these area types to guide planting priorities and design choices.



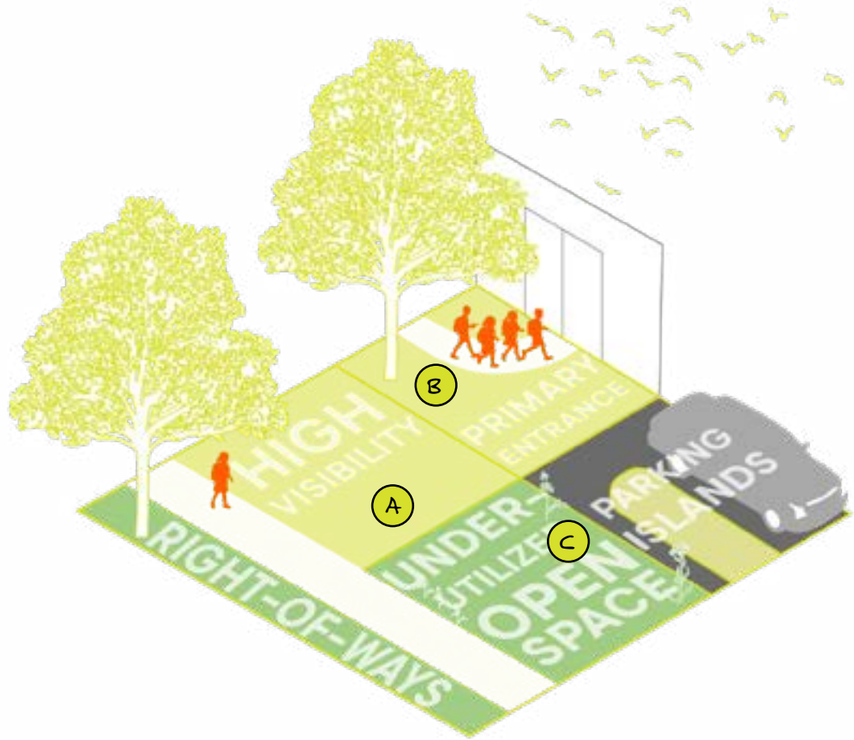
SUB TYPES:

PRIMARY ENTRANCE	HIGH VISIBILITY	UNDER-UTILIZED OPEN SPACE	PARKING ISLANDS	RIGHT-OF-WAYS
• Sun / Live Plants (Ornamental Garden) • Shade / Live Plants (Shade Garden)	• Sun / Hybrid (Pollinator Garden) • Shade / Hybrid (Shrublands)	• Seeded Shortgrass Prairie	• Shrubs • Ornamental Grass Planting	• Shrubs • Ornamental Grass Planting

Note: Areas owned by the City but maintained by DPS. Normally the perimeters of the school along the street.

05b. HOW MUCH SUN DOES THE SITE GET?

Continue to page 38



A What is "High Visibility"?

These areas experience less traffic than primary entrance areas—typically near secondary entrances. Areas of the school that face main roads could be considered high visibility.

B What if there are Multiple Entrances?

We recommend using the Primary Entrance Palettes at main entrances. Around secondary entrances, we recommend the High Visibility palette.This will mean most of our new plants will go to areas most used.

C Underutilized Open Space

On large campuses, expansive areas of turf often include unused edges and perimeters. These areas are prime examples of underutilized open space.

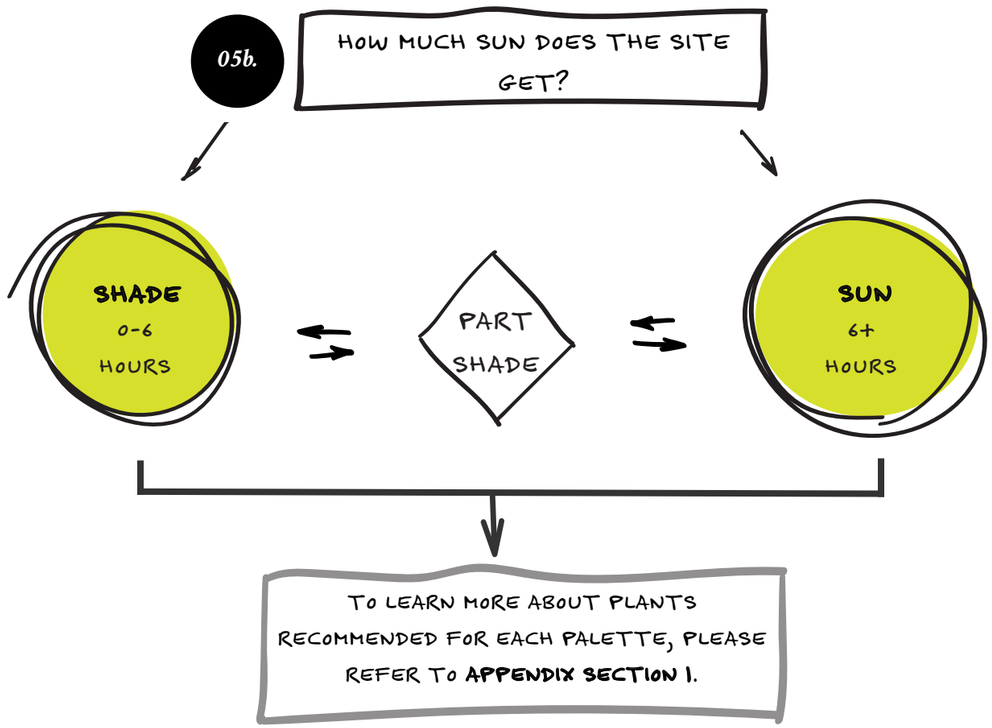
SELECT YOUR PLANT PALETTE & REFINE YOUR PLAN

PART C

Analyzing the Site:

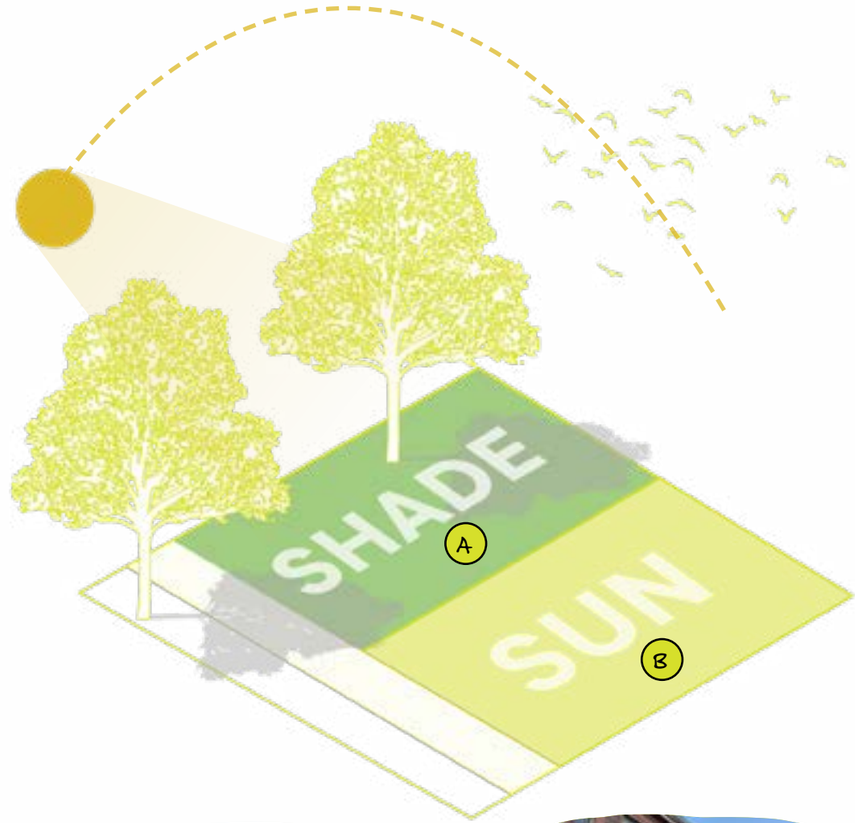
Use sun exposure as the first step in choosing the right palette for each space.

Before selecting a plant palette, it's important to understand how much sun the site receives. Areas with full sun—six or more hours of direct sunlight—can support drought-tolerant, native or climate-adapted species that thrive in dry, open conditions. Shadier areas, which receive less sun due to buildings or tree cover, require a different approach, prioritizing groundcover, seasonal interest, and ecological function where native options may be more limited.



Click Icon to Learn More:

SUN ANALYSIS TOOL



A Shady Landscapes

Using the sun analysis tool linked to above, or your own observation, ask: does this area stay mostly sunny or mostly shady during the day?

Is it sunny for less than 6 hours a day? Then we'll call that a Shady Landscape.

B Sunny Landscapes

Using the sun analysis tool linked to above, or your own observation, ask: does this area stay mostly sunny or mostly shady during the day?

Is it sunny for 6 hours or more? Then we'll call that a Sunny Landscape.

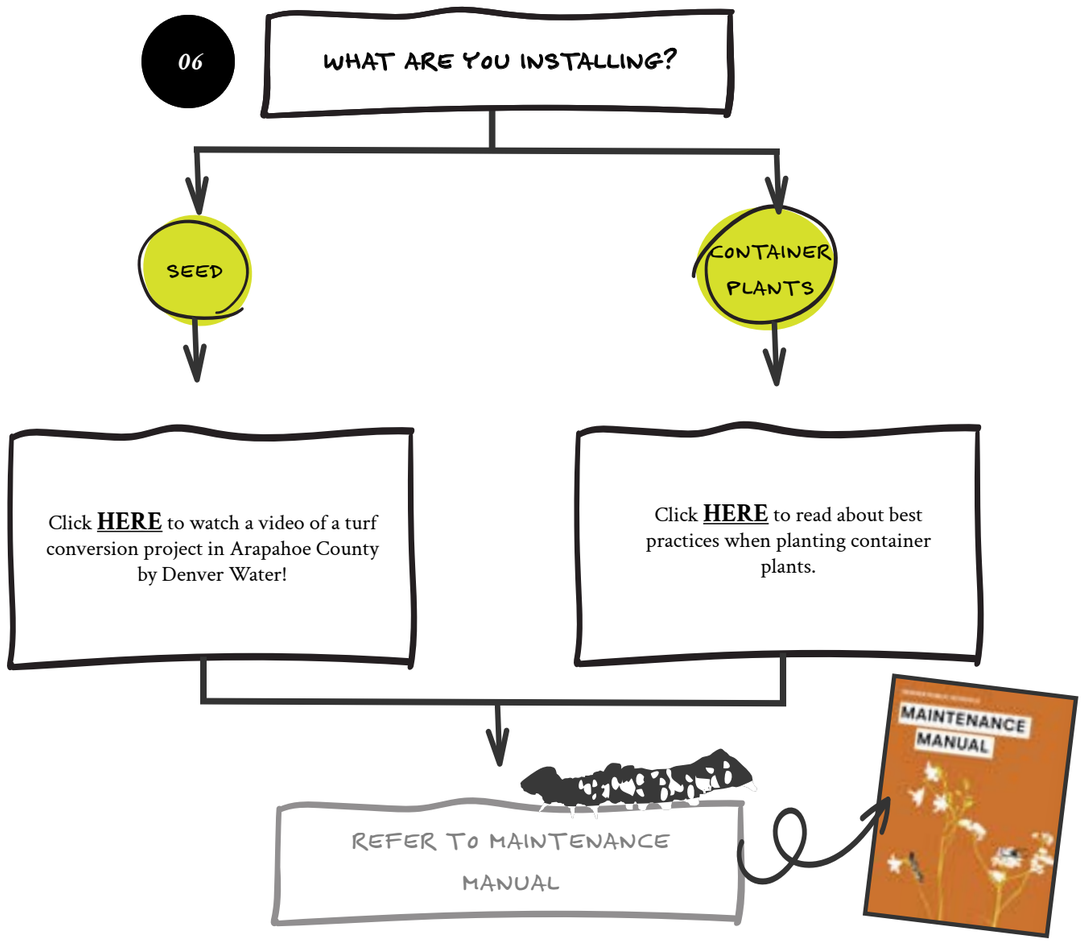
INSTALL SEEDS, PLANTS, & MULCH

How to plant:

This manual features seven plant palettes for varying site conditions based on location relative to the school, and whether the area is primarily sunny or shady for a majority of the day. There are likely other unique conditions that will arise. For these, the user can utilize the plant lists to create a custom plant palette based on the following principles.

For sunny areas, we are defining sustainable plant palettes as a mixture of plants that feature drought-tolerant, native or climate adapted plants for sunny areas.

For shady areas, where it is harder to find regionally native species, we're prioritizing coverage, pollinator supporting, water-absorbing ground material.



Click Icon to Learn More:

- NATIVE SEED INSTALLATION
- HOW TO PLANT CONTAINER PLANTS
- DENVER BOTANIC GARDENS WESTERN BEST PRACTICES

A Layout Plants!

The plant palettes shown in Appendix Section I are arranged loosely around an 18" grid, meaning most plants are spaced 18" apart. Where there are larger plants, especially shrubs, more space between plants will be needed, such as 3-4 feet between the center of the shrub and the plants next to it.

B Use a FINE organic mulch (Particles sized 1" and smaller)

Avoid using Large wood mulch, especially in shady areas and around new and existing trees. It takes a long time to break down, and holds water rather than allowing it to reach plant roots.

C Amend Soils with Squeegee

For low-water, sunny, landscapes, amend backfill with 50% Squeegee. It creates lean soils and good drainage. The material creates air pockets which allow water to flow through and get to plant roots.

PART 3:

APPENDIX

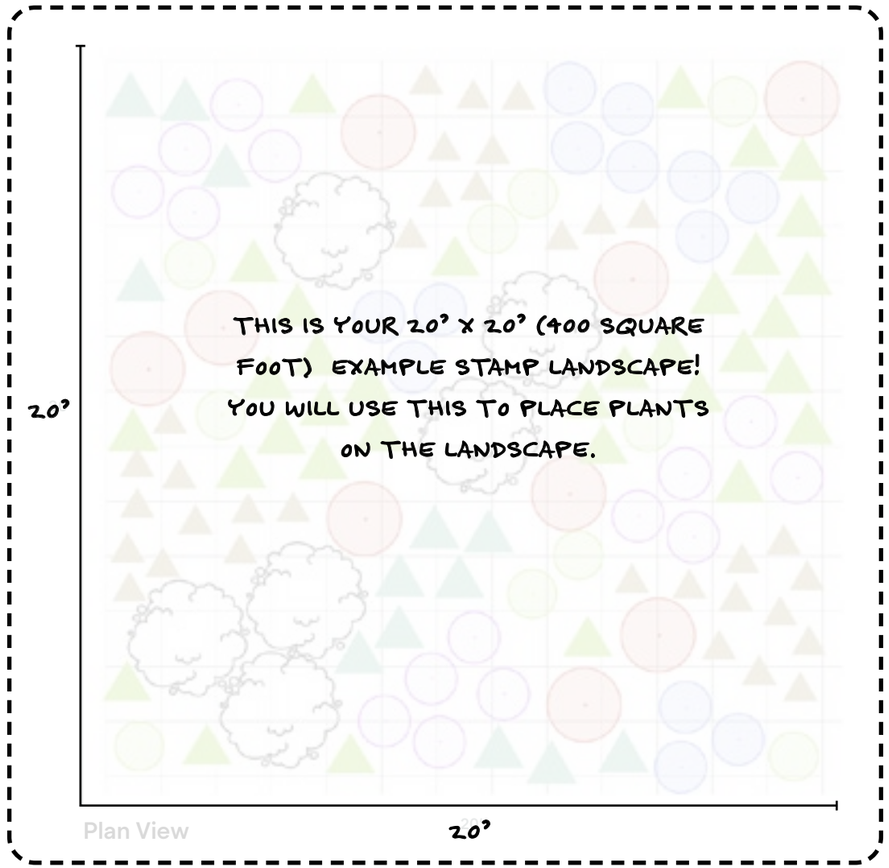
This section will show you how to:

In this section we get into a little more detail. Where you now have an understanding of which planting type should go where based on sun, shade, use, or proximity to the main entrance of a school, we will now list the recommended species for these areas, how they should be spaced, what size of plant we recommend (seed, plug or container)

Similarly, you may have identified that based on overly sunny, hot conditions at your school, a tree (or a number of trees) would be a welcome amenity. We've listed recommended tree species here.

Other new amenities you may consider as part of your design could include seating (log or boulder), walking paths, or outdoor classrooms, where students could play, read, learn with their class, or simply be together.

HOW TO USE THE PALETTES



SHRUB & FORB SPECIES

Symbol	Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for Sample 400 sf "Stamp"
	Dwarf Rabbitbrush *Ericameria nauseosa ssp. nauseosa var. nauseosa*	.015	6
	Pineleaf Penstemon *Penstemon pinifolius*	.0225	9
	Prairie Flax *Linum lewisii*	.0375	15
	Smooth Blue Aster *Aster laevis*	.0325	13

THIS IS YOUR MULTIPLIER!

GRASS SPECIES

Symbol	Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for Sample 400 sf "Stamp"
	Blue Grama *Bouteloua gracilis*	.085	34
	Little Bluestem *Schizachyrium scoparium*	.025	10
	Idaho Fescue *Festuca idahoensis*	.0325	13
	Prairie Junegrass *Koeleria macrantha*		

LET'S USE DWARF RABBITBRUSH AS AN EXAMPLE:

IF I'D LIKE TO PLANT AN AREA THAT IS 1200 SF, I WOULD MULTIPLY

1200 X .015 = 18

SO I WOULD NEED

18 DWARF RABBITBRUSH PLANTS!

THIS TELLS YOU WHICH PLANT PALETTE YOU ARE LOOKING AT AND WHETHER IT IS FOR SUN OR SHADE.

Palette Character Axon

Dwarf Rabbitbrush
Ericameria nauseosa ssp. nauseosa var. nauseosa

Pineleaf Penstemon
Penstemon pinifolius

Prairie Flax
Linum lewisii

Smooth Blue Aster
Aster laevis

THESE ARE PHOTOS OF SOME OF THE SPECIES IN THE PLANT PALETTE.

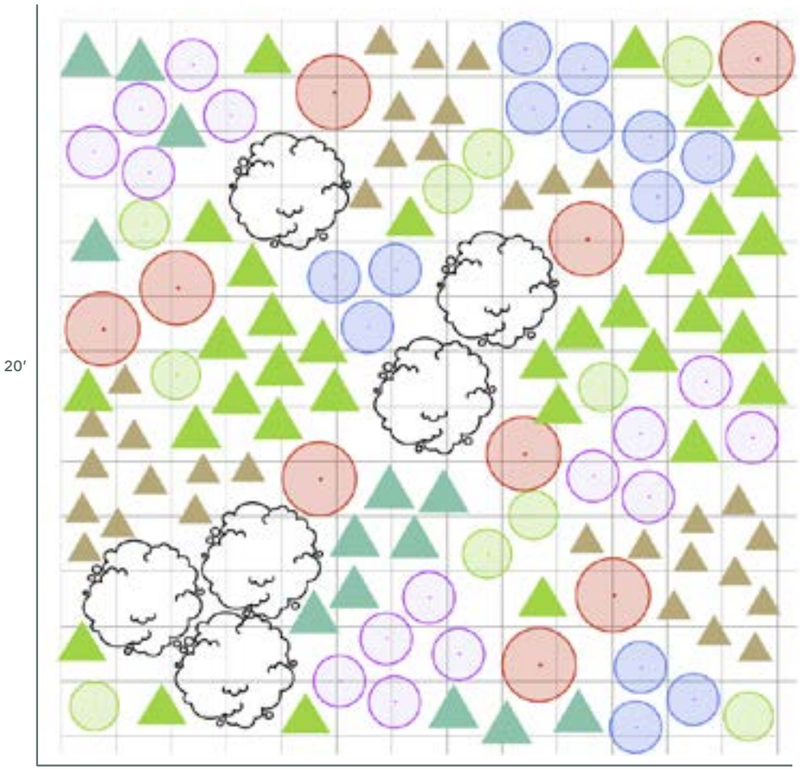
Little Bluestem
Schizachyrium scoparium

Idaho Fescue
Festuca idahoensis

Blue Grama
Bouteloua gracilis

Prairie Junegrass
Koeleria macrantha

PRIMARY ENTRANCE
(sun)



Plan View

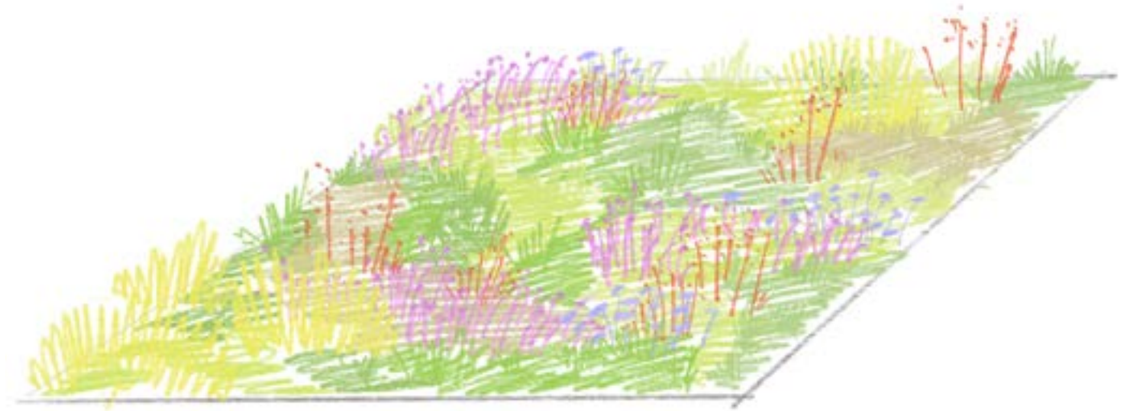
SHRUB & FORB SPECIES

Symbol	Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
	Dwarf Rabbitbrush *Ericameria nauseosa ssp. nauseosa var. nauseosa*	.015	6
	Pineleaf Penstemon *Penstemon pinifolius*	.0225	9
	Prairie Flax *Linum lewisii*	.0375	15
	Smooth Blue Aster *Aster laevis*	.0325	13

GRASS SPECIES (CONTAINER)

Symbol	Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
	Blue Grama *Bouteloua gracilis*	.085	34
	Little Bluestem *Schizachyrium scoparium*	.025	10
	Idaho Fescue *Festuca idahoensis*	.0325	13
	Prairie Junegrass *Koeleria macrantha*	.0825	33

PRIMARY ENTRANCE
(sun)



Palette Character Axon

Dwarf Rabbitbrush
Ericameria nauseosa ssp. nauseosa var. nauseosa

Pineleaf Penstemon
Penstemon pinifolius

Prairie Flax
Linum lewisii

Smooth Blue Aster
Aster laevis

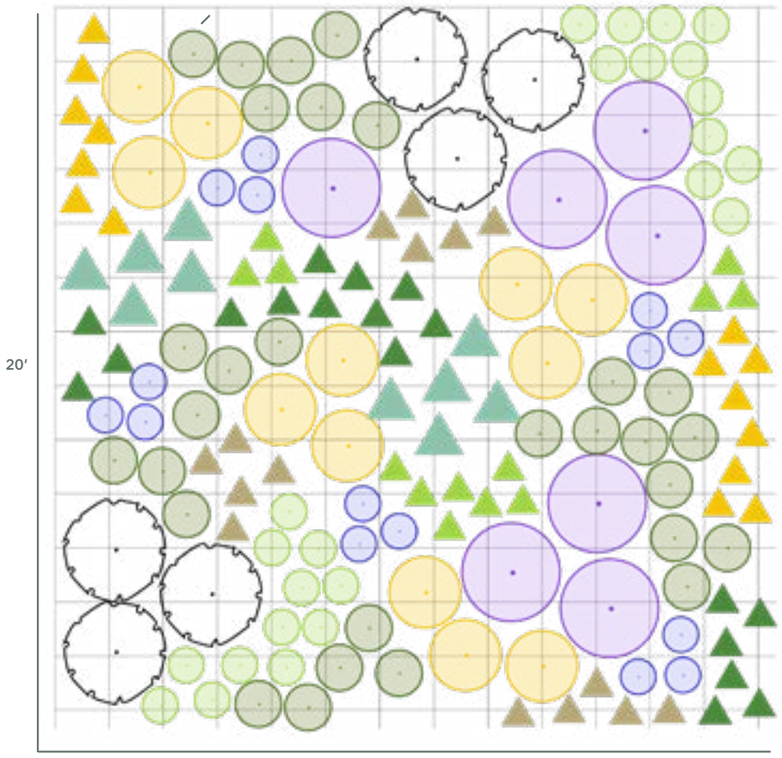
Little Bluestem
Schizachyrium scoparium

Idaho Fescue
Festuca idahoensis

Blue Grama
Bouteloua gracilis

Prairie Junegrass
Koeleria macrantha

PRIMARY ENTRANCE
(shade)



Plan View

SHRUB & FORB SPECIES

Symbol	Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for Sample sf "Stamp"
	Black chokeberry *Aronia melanocarpa*	.0175	*7*
	Bearberry *Arctostaphylos uva-ursi*	.015	*6*
	Prairie Sagebrush Artemisia frigida	.0375	*15*
	Foamflower *Tiarella cordifolia*	.0725	*29*
	Golden candles *Thermopsis lupinoides*	.06	*24*
	Lady's Mantle *Alchemilla mollis*	.03	*12*

GRASS SPECIES (CONTAINER)

Symbol	Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
	Appalachian Sedge *Carex appalachia*	.0325	13
	Grey Sedge *Carex divulsa*	.0425	17
	Plains Oval Sedge *Carex brevior*	.0375	15
	Idaho Fescue *Festuca idahoensis*	.025	10
	Prairie Junegrass *Koeleria macrantha*	.0375	15

PRIMARY ENTRANCE
(shade)

Palette Character Axon

Black chokeberry
Aronia melanocarpa

Bearberry
Arctostaphylos uva-ursi

Prairie Sagebrush
Artemisia frigida

Foamflower
Tiarella cordifolia

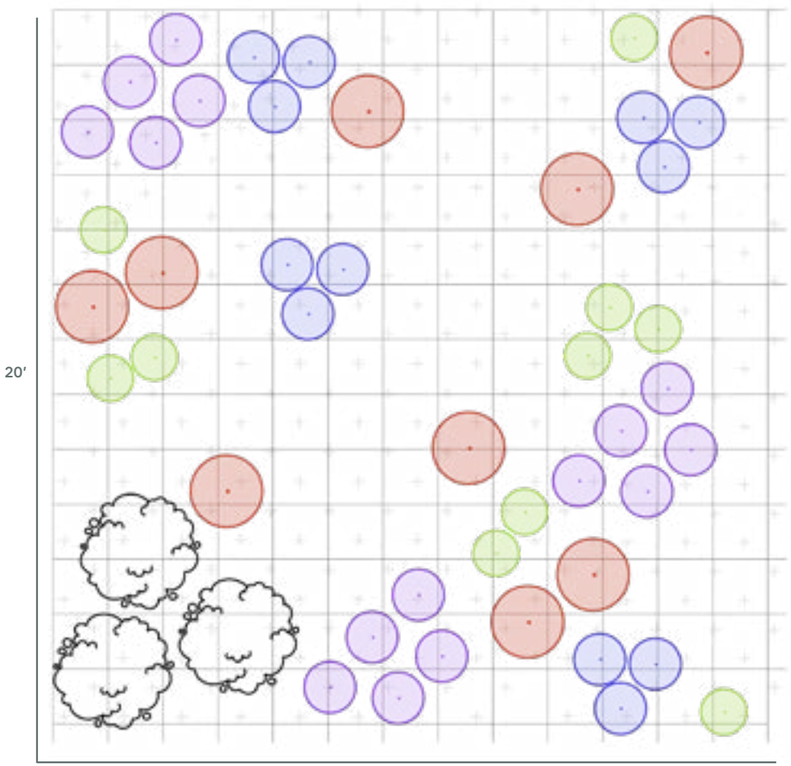
Golden candles
Thermopsis lupinoides

Lady's Mantle
Alchemilla mollis

Appalachian Sedge
Carex appalachia

Grey Sedge
Carex divulsa

HIGH VISIBILITY
(sun)



Plan View

g = grams of seed/plot

The numbers below are based on 50% coverage of the planting area, at a 3:1 ratio of warm season grasses to cool season grasses.

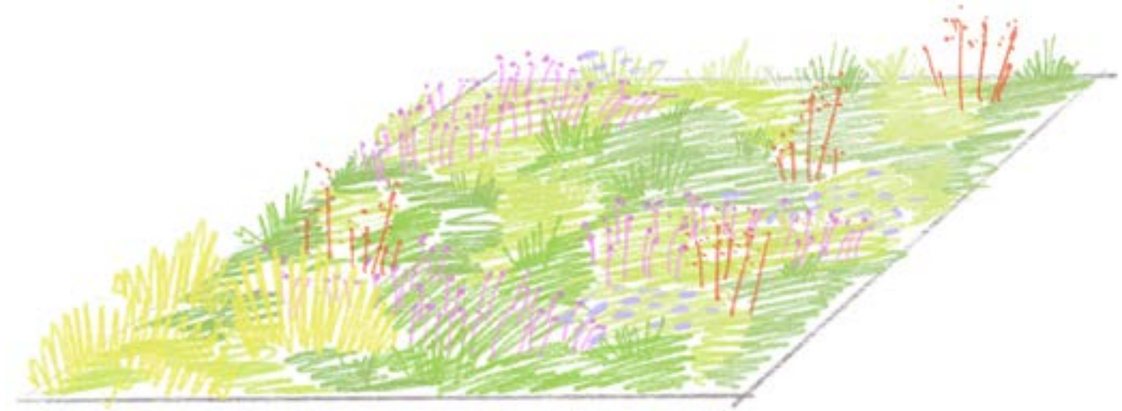
SHRUB & FORB SPECIES

Symbol	Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
	Dwarf Rabbitbrush Ericameria nauseosa ssp. nauseosa var. nauseosa	.0075	3
	Pineleaf Penstemon *Penstemon pinifolius*	.0225	9
	Prairie Flax *Linum lewisii*	.0375	15
	Smooth Blue Aster *Linum lewisii*	.03	12
	Little Bluestem *Schizachyrium scoparium*	.025	10

GRASS SPECIES (SEED)

Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
Cool Season Grasses		
Arizona Fescue *Festuca arizonica*	.00027	.108 g
Sandburg Bluegrass *Poa secunda*	.00008	.032 g
Prairie Junegrass *Koeleria macrantha*	.00013	.052 g
Warm Season Grasses		
Sideoats Grama *Bouteloua curtipendula*	.00355	1.42 g
Blue Grama *Bouteloua gracilis*	.63	252 g
Little Bluestem *Schizachyrium scoparium*	.005175	2.07 g

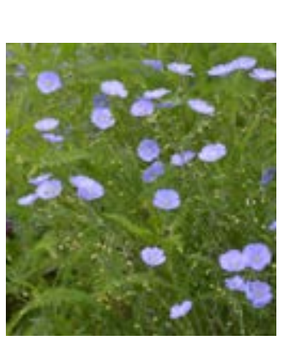
HIGH VISIBILITY
(sun)



Palette Character Axon

Dwarf Rabbitbrush
Ericameria nauseosa ssp. nauseosa var. nauseosa

Pineleaf Penstemon
Penstemon pinifolius



Prairie Flax
Linum lewisii

Smooth Blue Aster
Aster laevis

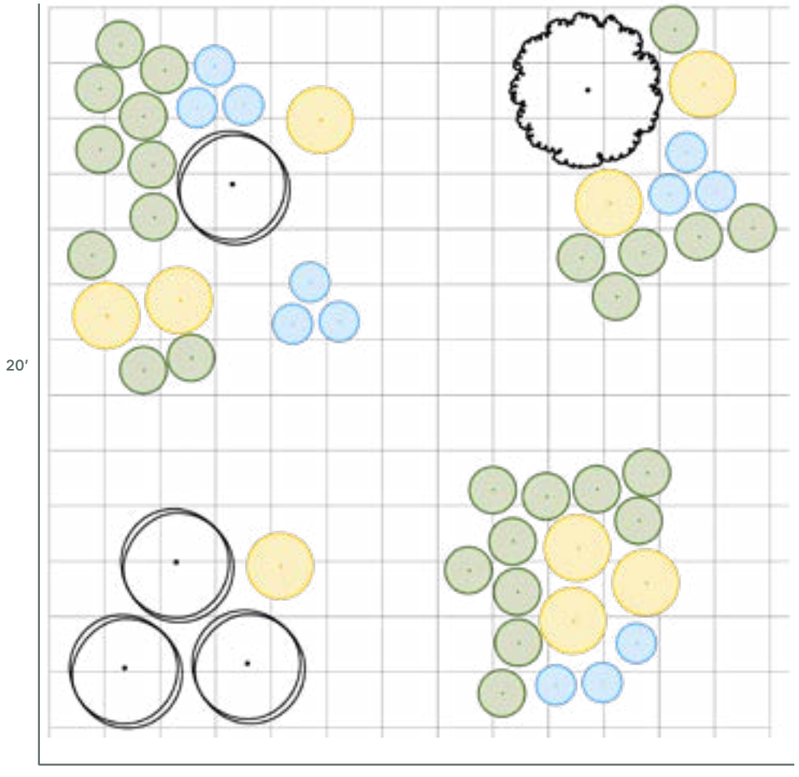
Little Bluestem
Schizachyrium scoparium

Sideoats Grama
Bouteloua curtipendula

Blue Grama
Bouteloua gracilis

Prairie Junegrass
Koeleria macrantha

HIGH VISIBILITY
(shade)



Plan View

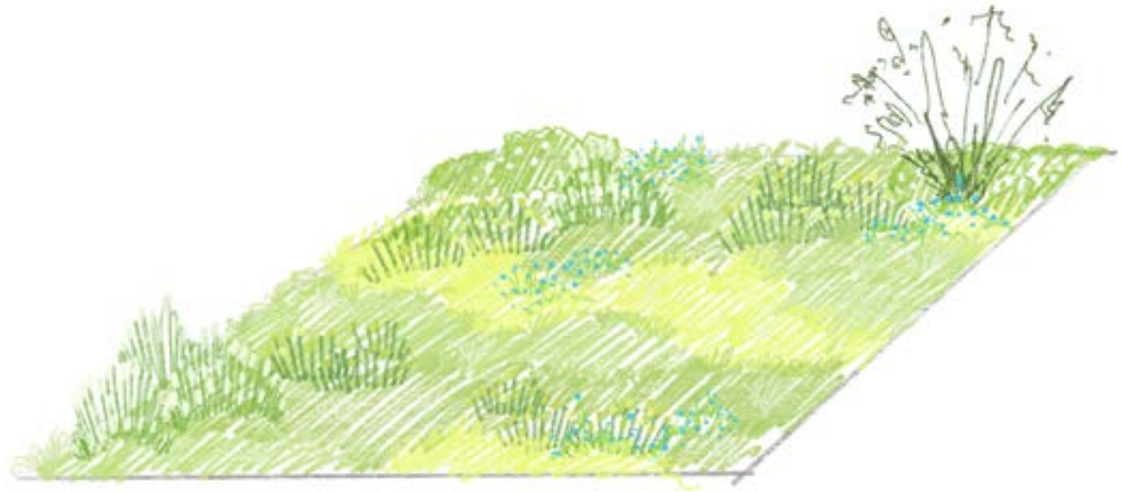
SHRUB & FORB SPECIES

Symbol	Common Name ***Scientific Name***	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
	Waxflower *Jamesia americana*	.0225	1
	Manchurian viburnum Mini Man dwarf *Viburnum burejaeticum*	.01	4
	Siberian bugloss *Brunnera macrophylla*	.03	12
	Hardy geranium *Geranium x cantabrigiense*	.065	26
	Lady's Mantle *Alchemilla mollis*	.0225	9

GRASS SPECIES (PLUGS)

Common Name ***Scientific Name***	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
Appalachian Sedge *Carex appalachia*	.15	60
Grey Sedge *Carex divulsa*	.15	60
Plains Oval Sedge *Carex brevior*	.2	80

HIGH VISIBILITY
(shade)



Palette Character Axon

Waxflower
Jamesia americana

Manchurian viburnum, Mini Man dwarf
Viburnum burejaeticum

Siberian Bugloss
Brunnera macrophylla

Hardy geranium
Geranium x cantabrigiense 'Biokovo'

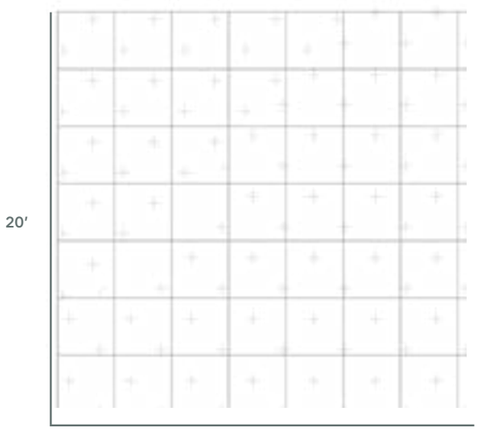
Lady's Mantle
Alchemilla mollis

Appalachian Sedge
Carex appalachia

Grey Sedge
Carex divulsa

Plains Oval Sedge
Carex brevior

UNDERUTILIZED OPEN SPACE



Plan View

SCATTER SEED AT RATES LISTED BELOW. YOU CAN **TALK TO YOUR LOCAL NURSERY FOLKS** TO GET A BETTER SENSE OF HOW TO DO IT!

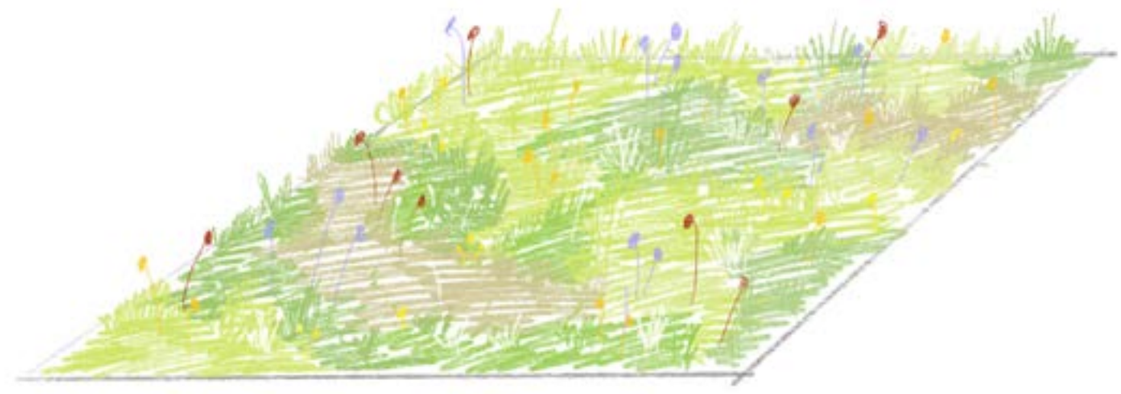
g = grams of seed/plot

The numbers below are based on 50% coverage of the planting area, at a 3:1 ratio of warm season grasses to cool season grasses.

SEEDED GRASSS & FORB SPECIES

Common Name	*Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
Grasses			
Sandberg bluegrass	Poa secunda	0.0001675	.067 g
Prairie junegrass	Koeleria macrantha	0.0000650	.026 g
Arizona Fescue	Festuca arizonica	0.0003325	.133 g
Little bluestem	Schizachyrium scoparium	0.0011525	.461 g
Blue grama	Bouteloua gracilis	0.0002100	.084 g
Western Wheatgrass	Pascopyrum smithii	0.0013150	.526 g
Green needle grass	Nassella viridula	0.0008250	.330 g
Bottlebrush squirreltail	Elymus elymoides	0.0007800	.312 g
Forbs			
Northern Sweet-vetch	Hedysarum boreale	0.0205000	8.20 g
Castilleja integra	Wholeleaf indian paintbrush	0.0004325	.173 g
Drummond's Milkvetch	Astragalus drummondii	0.0106000	4.24 g
Wild blue flax	Linum lewisii	0.0022850	.914 g
Mexican Hat	Ratibida columnifera pulchra	0.0104000	4.16 g
Rocky Mountain Penstemon	Penstemon strictus	0.0002375	.095 g
Scarlet bugler	Penstemon barbatus	0.0009275	.371 g
Common gaillardia	Gaillardia aristata	0.0025550	1.022 g
Dotted blazing star	Liatris punctata	0.0026750	1.07 g
California Poppy	Eschscholzia californica	0.0023025	.921 g
Prairie Sagebrush	Artemisia frigida	0.0002175	.087 g
Alpine Aster	Aster alpinus	0.0014150	.566 g
Aspen fleabane	Erigeron speciosus	0.0003950	.158 g

UNDERUTILIZED OPEN SPACE



Palette Character Axon

Northern Sweet-vetch
Hedysarum boreale

Prairie Flax
Linum lewisii

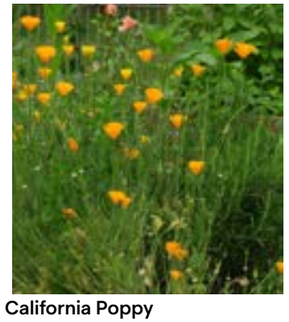
Wholeleaf indian paintbrush
Castilleja integra

Rocky Mountain Penstemon
Penstemon strictus

Mexican Hat
Ratibida columnifera pulchra

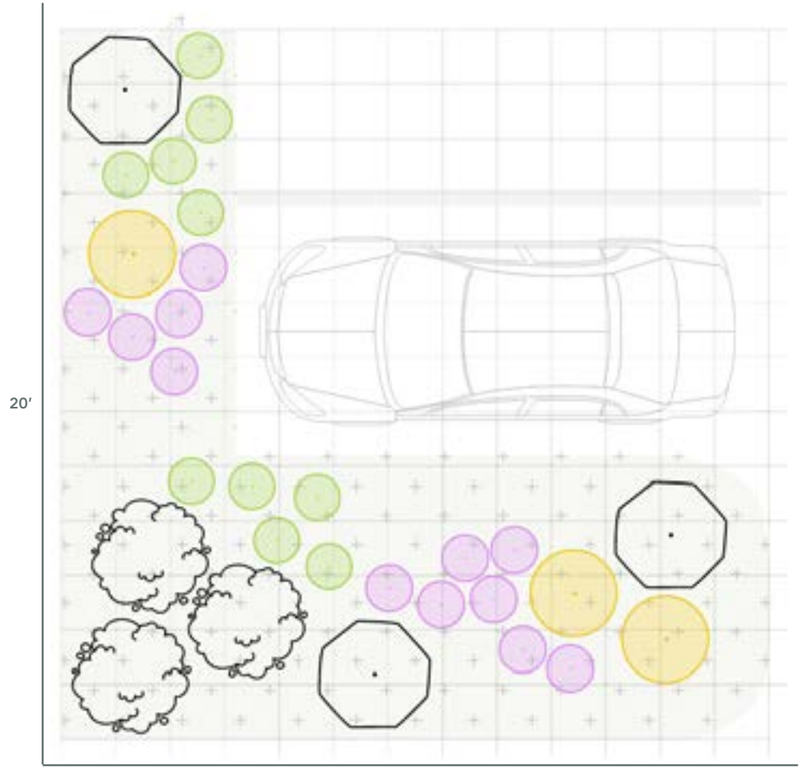
Common gaillardia
Gaillardia aristata

Dotted blazing star
Liatris punctata



California Poppy
Eschscholzia californica

PARKING ISLANDS



Plan View

g = grams of seed/plot

The numbers below are based on 50% coverage of the planting area, at a 3:1 ratio of warm season grasses to cool season grasses.

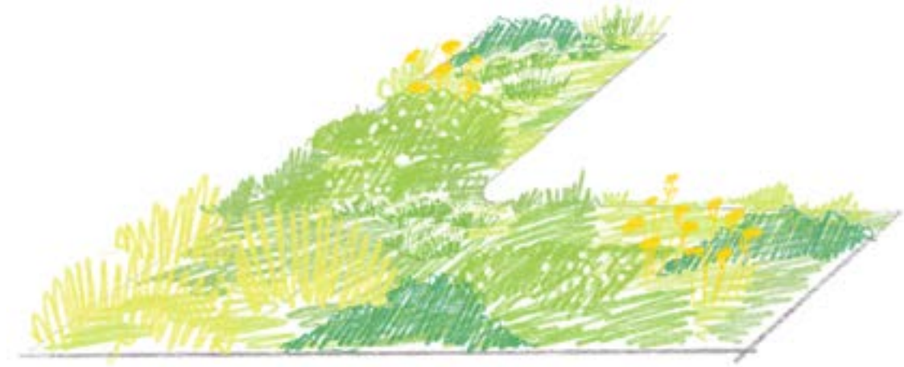
SHRUB & FORB SPECIES

Symbol	Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
	Dwarf Rabbitbrush Ericameria nauseosa ssp. nauseosa var. nauseosa	.0075	3
	Gro-Low Sumac *Rhus aromatica*	.0075	3
	Sulphur-flower Buckwheat *Eriogonum umbellatum*	.3025	121
	Silverheels horehound *Marrubium rotundifolium*	.03	12
	Stiff Goldenrod *Solidago rigida*	.0075	3

GRASS SPECIES (SEED)

Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
Cool Season Grasses		
Arizona Fescue *Festuca arizonica*	.000135	.054 g
Sandburg Bluegrass *Poa secunda*	.00004	.016 g
Prairie Junegrass *Koeleria macrantha*	.000065	.026 g
Warm Season Grasses		
Sideoats Grama *Bouteloua curtipendula*	.001775	.710 g
Blue Grama *Bouteloua gracilis*	.000315	.126 g
Little Bluestem *Schizachyrium scoparium*	.0026	1.04 g

PARKING ISLANDS

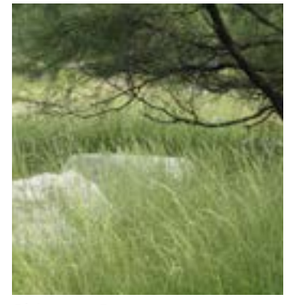


Palette Character Axon

Dwarf Rabbitbrush
Ericameria nauseosa ssp. nauseosa var. nauseosa

Gro-Low Sumac
Rhus aromatica

Sulphur-flower Buckwheat
Eriogonum umbellatum



Sideoats Grama
Bouteloua curtipendula

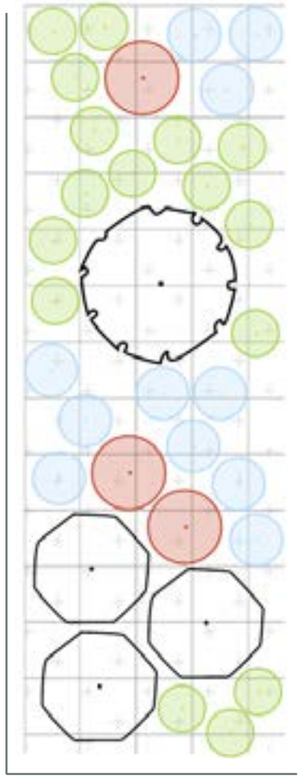
Stiff Goldenrod
Solidago rigida

Silverheels horehound
Marrubium rotundifolium

Blue Grama
Bouteloua gracilis

Prairie Junegrass
Koeleria macrantha

RIGHT - OF - WAYS



Plan View

g = grams of seed/plot

The numbers below are based on 50% coverage of the planting area, at a 3:1 ratio of warm season grasses to cool season grasses.

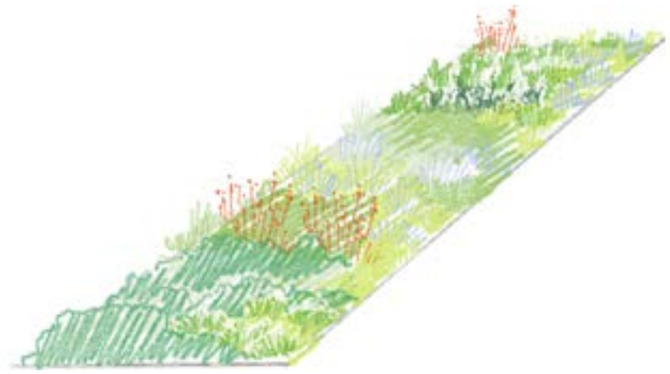
SHRUB & FORB SPECIES

Symbol	Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
	Sand Cherry *Prunus pumila var. besseyi*	.0025	1
	Gro-Low Sumac *Rhus aromatica*	.0075	3
	Pineleaf Penstemon *Penstemon pinifolius*	.0075	3
	White Wood Aster *Eurybia divaricata*	.04	16
	Jones' Bluestar *Amsonia jonesii*	.0275	11

GRASS SPECIES (SEED)

Common Name *Scientific Name*	Quantity per sf (Multiplier)	Quantity for 400 sf "Stamp"
Cool Season Grasses		
Arizona Fescue *Festuca arizonica*	.000095	.038 g
Sandburg Bluegrass *Poa secunda*	.0000275	.011 g
Prairie Junegrass *Koeleria macrantha*	.000045	.018 g
Warm Season Grasses		
Sideoats Grama *Bouteloua curtipendula*	.0011975	.479 g
Blue Grama *Bouteloua gracilis*	.0002225	.089 g
Little Bluestem *Schizachyrium scoparium*	.0018225	.729 g

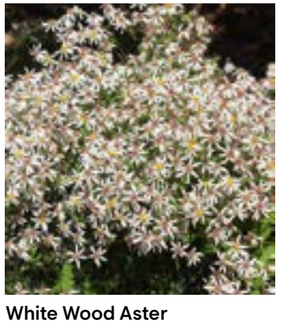
RIGHT - OF - WAYS



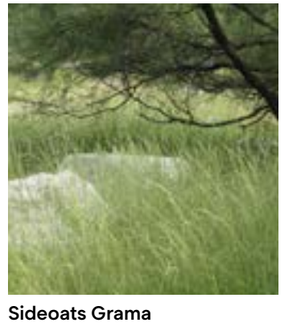
Palette Character Axon

Sand Cherry
Prunus pumila var. besseyi

Gro-Low Sumac
Rhus aromatica



White Wood Aster
Eurybia divaricata



Sideoats Grama
Bouteloua curtipendula

Pineleaf Penstemon
Penstemon pinifolius

Jones' Bluestar
Amsonia jonesii

Blue Grama
Bouteloua gracilis

Little Bluestem
Schizachyrium scoparium

02. SELECTING & SUPPORTING TREES

Tree Planting Guidelines

Trees aren't technically "low-water" plants since they need regular, long-term irrigation, but the benefits they provide are worth the investment. Shade and cooling, stormwater absorption, and habitat for birds and other wildlife all make trees a vital part of a healthy school landscape.

Planting size: Start with trees around 1.5" caliper to reduce transplant stress and give them the best chance to establish.

Diversity: **Mix up your species** selection. A diverse campus canopy is stronger and more resilient to pests, diseases, and extreme weather.

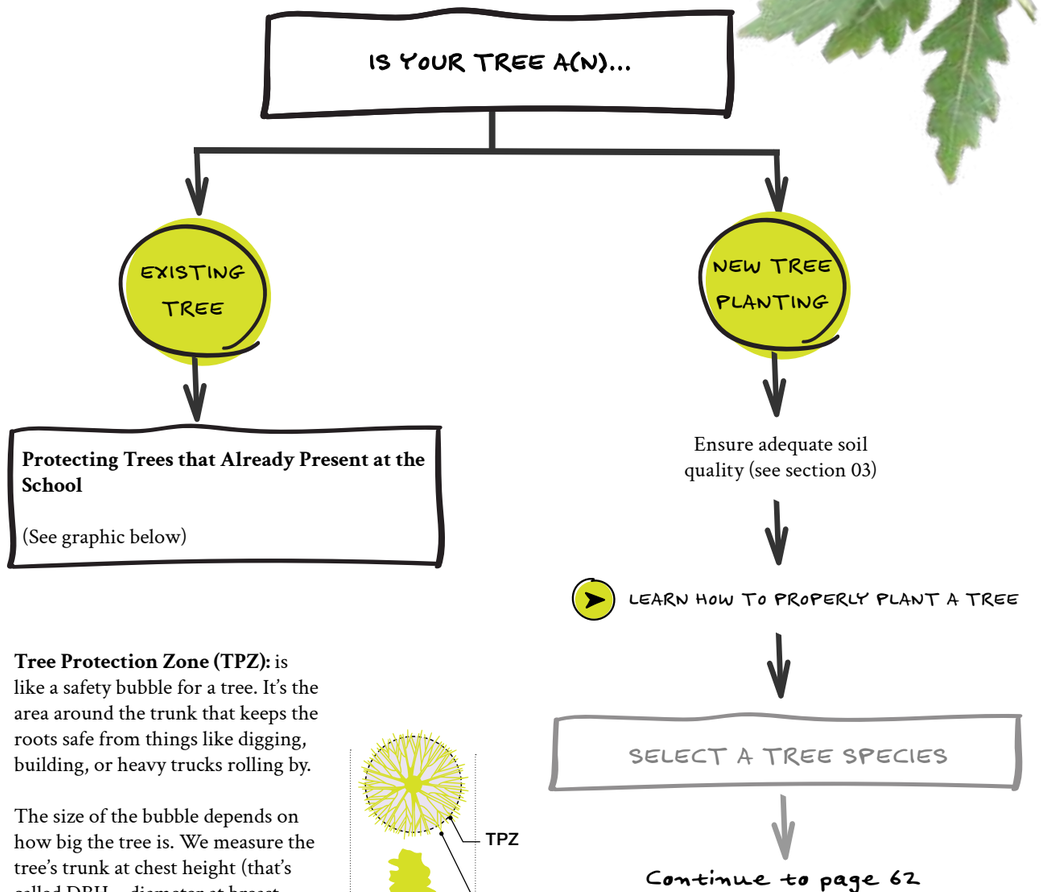
Species lists: This manual includes recommended options for deciduous canopy trees, understory trees, and evergreens. Be sure to also check the City Forester's Approved Tree Lists.

Avoid problem trees: Steer clear of species with known pest issues, like Ash.

Plant in clusters: Group trees together instead of planting in long strips. Clusters are easier to irrigate efficiently and help create cooler, more comfortable microclimates.

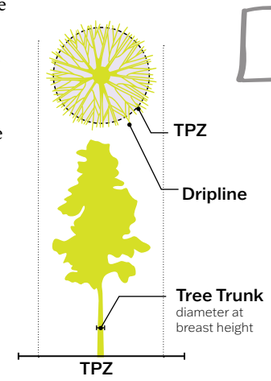
SELECTING & SUPPORTING TREES PART A

Gambel Oak
Quercus gambelii

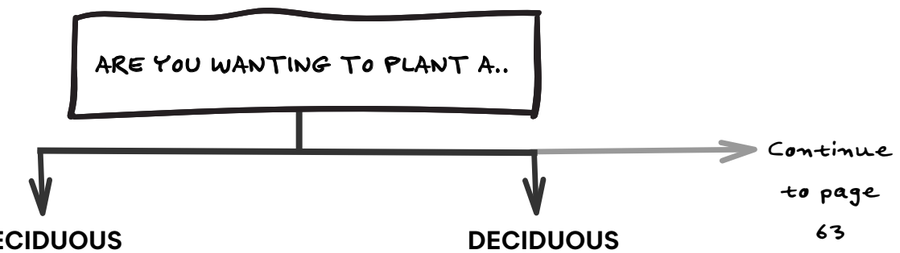


Tree Protection Zone (TPZ): is like a safety bubble for a tree. It's the area around the trunk that keeps the roots safe from things like digging, building, or heavy trucks rolling by.

The size of the bubble depends on how big the tree is. We measure the tree's trunk at chest height (that's called DBH—diameter at breast height). A good rule is to give the tree about 1.5 feet of space in every direction for each inch of trunk thickness. Sometimes this safety bubble goes all the way out to the tips of the branches—the tree's "dripline."



SELECTING & SUPPORTING TREES PART B



DECIDUOUS UNDERSTORY

Acer grandidentatum
Rocky Mountain Maple

Cercis canadensis
Eastern Redbud

Crataegus crus gali
Thornless Cockspur Hawthorn

Crataegus ambigua
Russian Hawthorn

Crataegus viridis
Green Hawthorn

Quercus gambelii
Gambel Oak

DECIDUOUS CANOPY

Catalpa speciosa
Catalpa

Gymnocladus dioicus
Kentucky Coffeetree

Quercus bicolor
Swamp White oak

Quercus macrocarpa
Bur Oak

Quercus muehlenbergii
Chinkapin Oak

Malus x 'Coralcole'
Coralburst Crabapple

Ulmus davidiana var. japonica
ACCOLADE
ACCOLADE Elm

Kentucky Coffeetree
Gymnocladus dioicus

SELECTING & SUPPORTING TREES PART C

EVERGREEN

Picea pungens
Colorado Spruce

Pinus flexilis
Limber Pine 'Vanderwolf's Pyramid'

Juniperus chinensis
Chinese Juniper

Juniperus scopulorum
Rocky Mountain Juniper

Picea glauca
Black Hills Spruce

Pinus edulis
Pinon Pine

Pinus hedreichii
Bosnian Pine

Pinus ponderosa
Ponderosa Pine

Pinus strobiformis
Southwestern White Pine

Colorado Spruce
Picea pungens

03. AMENITIES GUIDE

Encouraging students & faculty to use newly planted areas:

As part of your project, you may want to include paths, or seating areas that could encourage students and faculty to explore or spend time within newly created outdoor spaces. This appendix page highlights potential project elements that could be incorporated into turf conversion efforts. Walking paths made of crusher fines would allow water to absorb naturally into the ground, and seating options made of natural stone, boulders, or wood, would reflect the colors and character of Denver's locally available materials.

SEATING
Natural Stone

PATHWAYS & OPEN AREAS
Crusher Fines

SEATING
Wooden, Elevated off the Ground

DENVER PUBLIC SCHOOLS