

Stormwater Management

Site Inventory

Overview

Students will gain an understanding of how to map stormwater features on a site.

Grade Level

6 - 12

Science Standards

MD 1.A.1, MD 1.B.1, MD 2.A.1, MD 5.A.1, MD 5.A.2, MD 7.A.1, 3-ESS3-1, 3-5-ETS1-2, 4-ESS2-1, 4-ESS2-2, 4-ESS3-2, MS-ETS1-3, HS-ETS1-3

Time

90 mins

Teacher Difficulty



Group Size

3 - 4 Students

Materials

- Handouts (one per student): Vocabulary, Site Inventory Symbols, Site Inventory Questions, Site Inventory Samples
- Journal or paper for recording observations and writing utensils

Objectives

- Learn what landscape architecture is and why it is important to stormwater design
- Learn what a site inventory is and how to conduct one
- Perform a site inventory to determine the best location for BMPS

Warm Up Activity

Evaluate prior knowledge and introduce new terms through class discussion

1. *What is Landscape Architecture?*

Answers will vary. Landscape architecture is a multidisciplinary field that combines aspects of biology, civil engineering, horticulture, hydrology, architecture, art, ecology, and much more. It is the design of outdoor spaces such as parks, gardens, streetscapes, residences, etc. There are many different methods and goals. One of the first things a landscape architect has to do in design is complete a site inventory.

2. *What is Site Inventory?*

Answers will vary. Site inventory is one of the first stages of the design process that involves identifying, observing and recording different features on the site such as stormwater flow, vegetation, sun and shade patterns, wildlife habitat, and elevation changes.

PROCEDURE CONTINUED

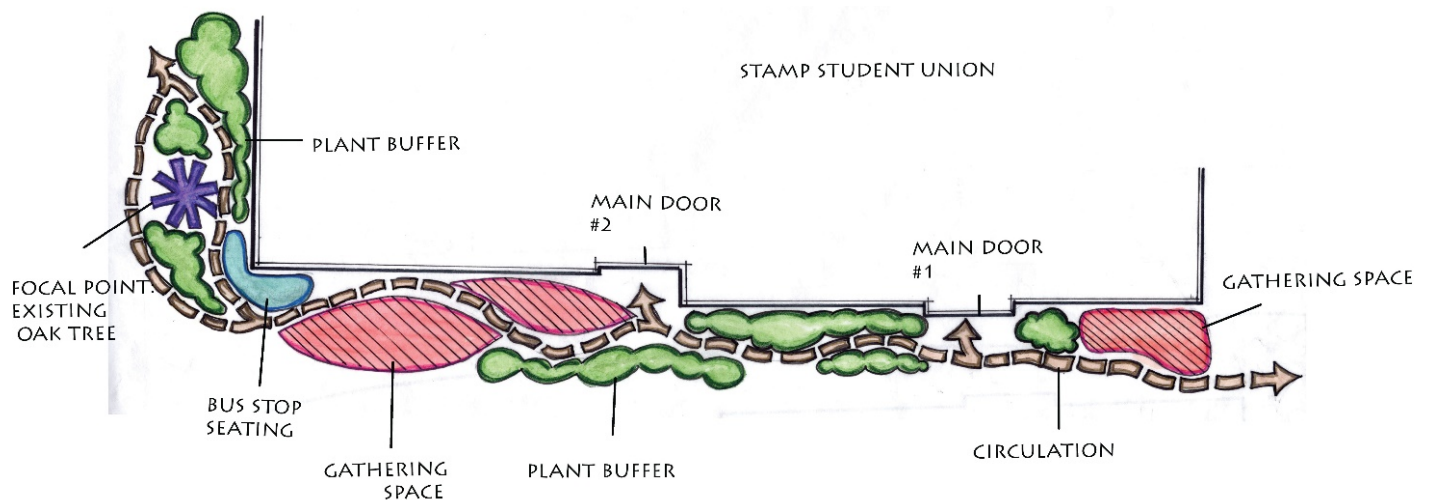
Introductory Activity

Introduce vocabulary and discuss the different aspects of a site that Landscape Architects record as part of their site inventory

Hand out the Site Inventory Vocabulary Sheet and review it with the students. Discuss the different features they will be recording. These include: plants, moving water or ponding, slopes, high points and low points, erosion, downspouts, impervious surfaces, buildings, sun and shade patterns, and wildlife. Students will be using their site inventories to determine the best locations on the site for different stormwater management facilities.

Hand out the Site Inventory Symbols and Samples Sheet. These are the symbols the students should use to mark their observations on their maps. Usually Landscape Architects record much more than what is listed on the sheet, but the goal of this lesson is to focus on stormwater.

SITE INVENTORY SAMPLE



Developmental Activity

Show students different examples of site inventory maps

Go over a few examples and talk about the different symbols you see. Students should use the symbols on their handouts, but they can add symbols for other observations they make if they choose to.

SITE INVENTORY SYMBOL EXAMPLES



Ponding



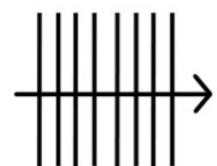
Shady Area



Sunny Area



Water flow



Steep Slope

PROCEDURE CONTINUED

Guided Practice Activity

Walk around school grounds with students to record observations

Give each student a map of the school grounds to record their findings. If available, give each student a clipboard to use while drawing. Students can work in small groups or individually, but each should produce their own inventory map. If the property is exceptionally large, students can split into groups to record separate areas. Have students focus on stormwater elements first, including ponding, impervious surfaces, and stormwater flow lines.

Independent Task Activity

Color maps and discuss observations

Students should use this time to make their maps readable and colorful. Make sure they use the symbols given on the symbols handout so the maps are consistent between students. Students should talk in small groups and share their maps and observations.

Assessment Activity

Discuss complete inventory maps with the whole class

Students can pin their maps up on the wall and walk around to review each other's maps. Discuss the different observations that were made. Have students explain what they noticed and how they labeled it. Have students answer the **Observations Questions Sheet**. Collect inventory maps for future use.

Closing

Discuss why Landscape Architects take site inventories and introduce site analysis

This can be a quick discussion and review of the lesson. Landscape Architects do site inventories to become familiar with all of the features on the site in order to make better design decisions.

Extension Activity

Expand knowledge of site inventory with activities out of the classroom

- Students can neaten maps and add in any missing symbols at home
- Students can make a site inventory map of their own yards at home

HELPFUL HINTS

If necessary, do a preliminary walk around the school property to get familiar with the site. Take note of the things things students should record.

Sketch or make copies of a map of the school grounds from Google.

**Stormwater
Management**

Site Inventory KWL Sheet

What I Know

What I Want to Know

What I Learned

Circulation

The areas and directions in which vehicles, bicycles, and pedestrians travel. A map of the most trafficked areas on a site.

Detention pond

A pond built with the purpose of holding stormwater temporarily until it can be drained or infiltrated elsewhere.

Downspout

A pipe that carries rainwater from a roof gutter. Downspouts are typically vertical and lead water off of a roof to the ground.

Erosion

The slow removal and wearing away of soil on the earth's surface by water, ice, wind, etc.

Flow Path

A path that stormwater takes when travelling across the landscape.

Focal Point

A point or feature on the site that draws one's attention.

High Point

The highest point of elevation on the site. Every point on the site should be downhill from this point. A relative high point is the highest point in a certain part of the site.

Impervious surface

An impenetrable surface that does not allow water to filter through it. It is typically a man-made surface such as asphalt, concrete, etc.

Landscape Architecture

A multi-disciplinary profession that combines architecture, engineering, biology, horticulture, ecology, and design. Professionals design outdoor spaces such as gardens, parks, streetscapes, campuses, and residences.

Low Point

The lowest point of elevation on the site. Every point on the site should be uphill from this point. A relative low point is the lowest point in a certain part of the site.

Pervious surface

A surface made out of material that is porous enough to allow water to filter through it. These surface types can vary, but they include soils and groundcovers, permeable paving, etc.

Ponding

The build-up of water in a certain location due to poor drainage.

Retention pond

A pond built with the purpose of holding water permanently. Some water will be lost to evaporation, but the pond will pretty much always have standing water from a rain event.

Site Inventory

One of the first stages of the design process that involves identifying, observing and recording different features on the site such as stormwater flow, vegetation, sun and shade patterns, wildlife, habitat, and elevation changes.

Storm Drain

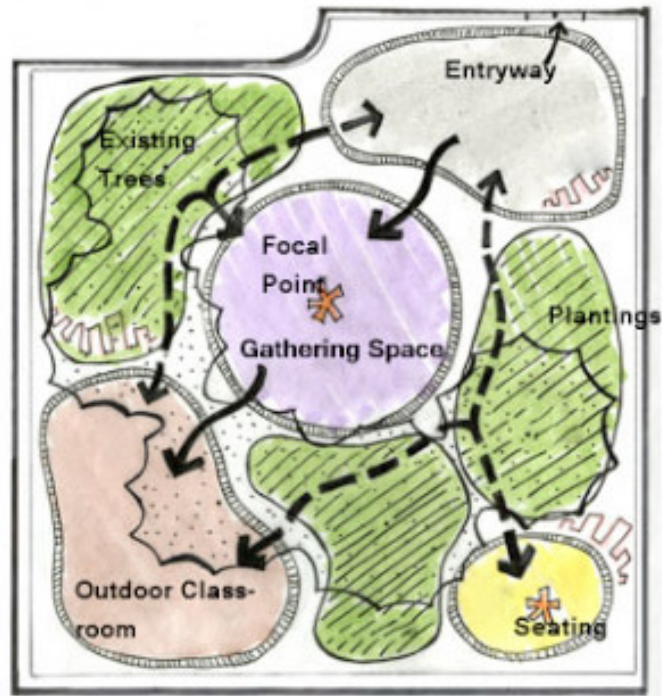
A metal grate in the landscape used to collect and divert stormwater into a sewer system.

Site Inventory Samples

The following are varying examples of site inventory maps

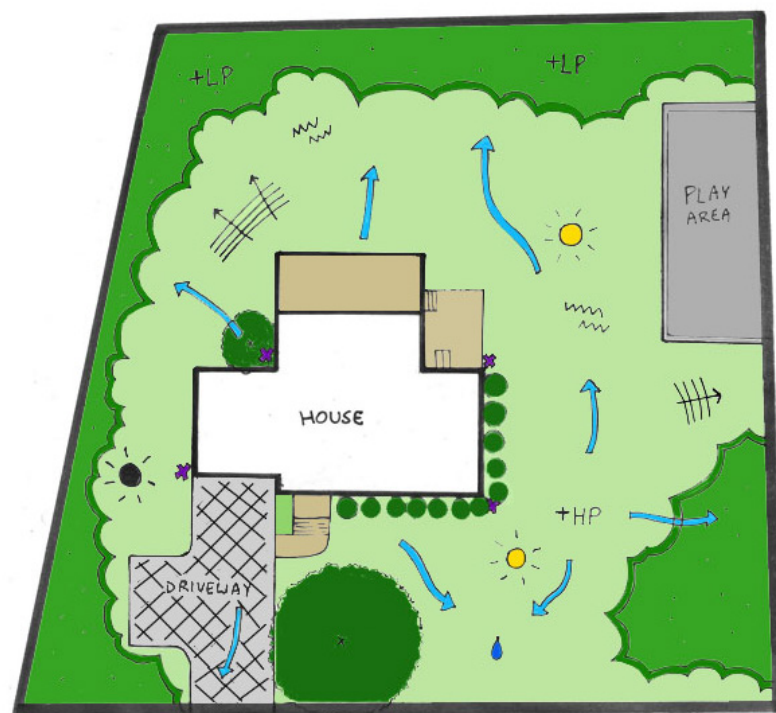
Example 1

Shows circulation paths, vegetation, existing trees, focal points, and gathering spaces. This is a basic site inventory because it labels different features, existing patterns and uses currently on the site. Colors can be effective in differentiating spaces.



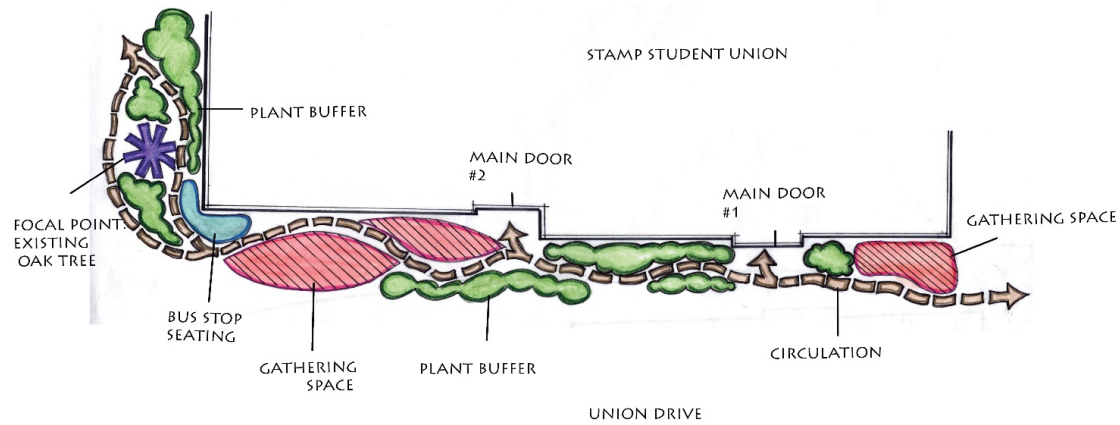
Example 2

This site inventory focuses on the path of water flow, sun/shade patterns, high and low points, downspouts, and vegetation. This focuses on the location and movement of stormwater as well as plant information.

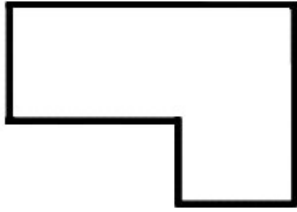


Example 3

This site inventory focuses on circulation, vegetation, existing gathering spaces, and focal points. This inventory includes context such as entrances to the site and neighboring roads.



Site Inventory Symbols



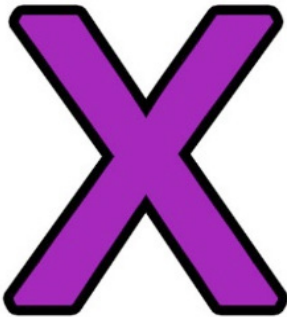
Building Outline



Low Point



High Point



Downspout Opening



Shady Area



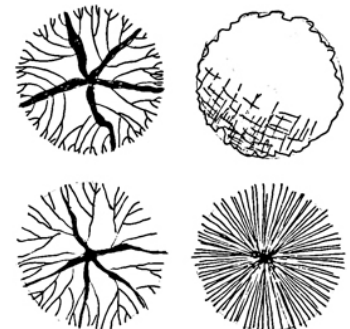
Sunny Area



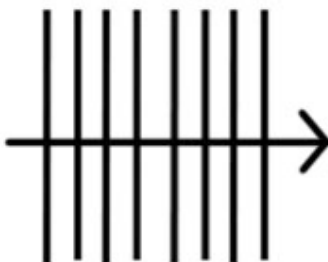
Ponding



Erosion



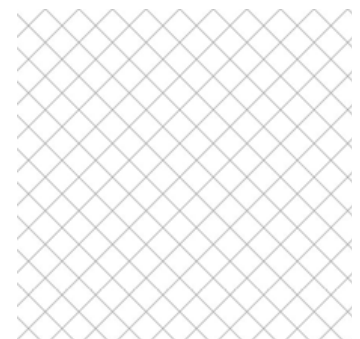
Trees and Shrubs



Steep Slope



Water Flow



Impervious Pavement

Site Inventory Questions

Fill out answers in the space below the questions

Question 1

What were some of the observations you made while out on the school grounds?

Question 2

Were there any areas of the property that you think are underutilized?

Question 3

Did you observe any drainage issues in the form of puddles, erosion, or standing water anywhere on the site?

Question 4

If you were a landscape architect and you were told to re-design the school property, how would you design it? (Write or draw your answer).